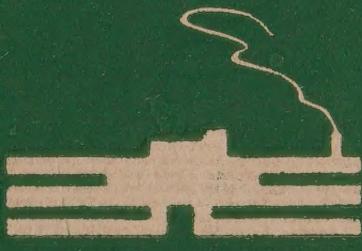


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Small Plant Health and Medical Programs



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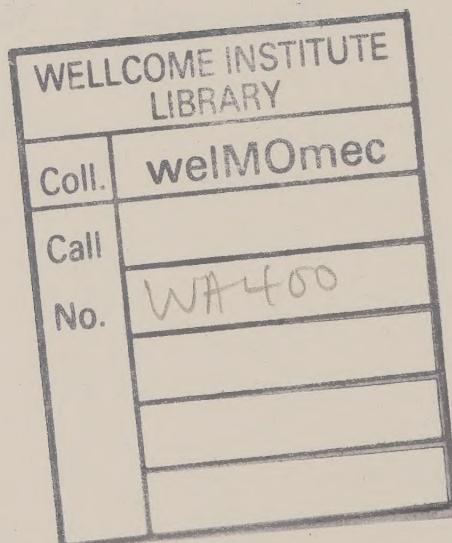
**SMALL PLANT HEALTH
and
MEDICAL PROGRAMS**

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and

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**FEDERAL SECURITY AGENCY
Public Health Service
Division of Occupational Health
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Foreword

THIS report on small plant health and medical programs has been prepared to meet requests for current information on the subject and as an aid to employers who wish to develop such programs. It is hoped that, in addition to stimulating the development or expansion of in-plant health services, it will be useful to those who have a special interest in employee health: plant medical directors, company executives, industrial physicians and nurses, trade union leaders, trade association officials, governmental industrial hygienists, directors of voluntary health agencies, and public health officials.

The report is concerned primarily with the services provided in industry by physicians and nurses. It does not cover the technical aspects of industrial hygiene engineering and chemistry or the clinical aspects of occupational medicine.

In addition to a general discussion of industrial health and medical services and the type and extent of programs now existing in small plants, the report also includes detailed descriptions of several small plant programs. The inclusion of certain programs and the omission of others in no way imply a judgment as to the merits of either group. Those that have been selected for inclusion represent examples of programs developed through a variety of methods and under various auspices. In each case they have been described fully in the hope that the details may be useful to others wishing to develop such programs.

This report was prepared on the basis of published material, correspondence, and personal interviews. It was made possible only through the kind cooperation of the firms which supplied information on their health programs and the persons associated with the demonstration projects who reviewed the plan descriptions, provided data on the current status of the programs, and clarified information found in earlier publications. Grateful acknowledgment is also made to those persons active in the field of occupational health who made many constructive suggestions, and to Dr. William M. Gafafer, Mrs. Tula Brocard, and other members of the Division staff who contributed to the report.

Seward E. Miller
Medical Director
Chief, Division of Occupational Health

Organization of Material

THIS report is in four sections. The first presents information on the present and anticipated labor force and the new workers joining it, anticipated production, and the place of the small plant in the total production picture. It describes the need for employee health programs and the trends in the development of major types of health programs. It gives the most current data on personnel and facilities servicing the employees in establishments of various sizes in the United States as a whole, and in selected States and cities.

In section II, special problems incident to the development of small plant health programs are described, and data are provided on the costs and accomplishments of such programs. The possibilities are presented of utilizing local health and medical facilities and the consultation services available through national, State, and community organizations.

The third section describes in detail six cooperative small plant health programs, four community-wide projects developed under a variety of sponsorships, and four individual small plant programs. Included are items that may be of value to others in initiating such programs, such as material on promotional plan and follow-up, and the costs of establishing and maintaining the programs. The present status of each project is also described.

Appendices contain detailed information that may be of assistance to those responsible for the development and direction of small plant programs.

The list of references is restricted to general information in the field and does not include the references following the description of each of the programs included in section III.

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SECTION I

Employee Health in Relation to Industrial Expansion



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Increased Production and Full Utilization of Manpower

Volume of Production and Plant Improvement

In spite of the increasing tendency toward mass production, which is one of the major economic characteristics of the twentieth century, we are still a Nation of small businesses. The small establishments which operate in every city and town are a major source of our productive strength, without which America would be "a gigantic skeleton, a great industrial framework lacking blood, flesh, and nerves."

On July 31, 1951, Congress added section 714 to the Defense Production Act without a single adverse criticism. This amendment set up the Small Defense Plants Administration to preserve and promote small-business enterprise. Telford Taylor, administrator of the program, has stated that its purpose is not only to help the small-business man, but to get the small-business man to help the defense effort.

According to a U. S. Department of Commerce report on defense production, the bulk of the prime contracts placed by the defense agencies during the 18-month period, from June 1950 to January 1952, went to large companies having the necessary facilities and resources to get into production rapidly. As the defense program advanced, however, more and more facilities in firms of all sizes were utilized, and by January 1952 a significant number of small companies had already received a share of the prime contracts placed by the Defense Department as well as subcontracts placed by the larger firms.

More than one-fifth of the prime contracts let by the Defense Department from July 1950 through September 1951 were awarded to plants employing fewer than 500 persons. (174)

From June 1950 to January 1952, Congress appropriated \$120 billion for the military functions of the Defense Department and for the Mutual Defense Assistance Program. By December 31, 1951, \$78 billion had been obligated for defense purposes, and the relative share of the Nation's output of goods and services allocated to the defense program had more than doubled during the 18-month period.

The results of the fifth annual McGraw-Hill survey of business plans for new plant and equipment indicate that industry not only expects to spend more than \$20 billion during 1952, but also that expenditures during 1953, 1954, and 1955 may exceed \$14 billion annually. A little more than 50 percent of these planned expenditures will be for expansion; the balance will be spent in modernization. The survey also revealed that after 1952, 83 percent of the companies responding to the

inquiry are planning substantial further modernization, that 48 percent will need more capacity to make their present products, and that 33 percent plan additional capacity to make new products.

Most companies reported that they would allow from five to ten years to pay off the cost of additional plant and equipment. Faced with these obligations, they will have an additional interest in providing employee health services and other programs which make it possible for employees to produce at their highest efficiency.

Manpower Requirements

In a national economy based on conservation and expansion during an indefinitely long period of time, the need for carefully protecting and wisely using our manpower is self-evident. Manpower is our major national resource, and without a labor force producing at top level, facilities and equipment are useless.

Robert C. Goodwin, director of the Bureau of Employment Security, predicts that in 1952 the defense labor requirements, together with demands from civilian industries, should bring civilian employment to a midsummer peak of 63 million, the highest in the Nation's history. "The manpower problems of 1952," Mr. Goodwin said, "will be considerably greater than those of 1951 and will be more acute in a growing number of areas. To handle civilian manpower needs it will be necessary to bring work to the worker to the utmost possible extent, to use to the full the skills and abilities of our work force, and to attract large numbers of additional workers into the labor force in those areas where demand exceeds local supply." (177)

The following tabulation prepared by the Bureau of Labor Statistics, U. S. Department of Labor, gives the labor force in the fourth quarter of 1951 and the projected labor force for the similar period in 1952 and 1953. (179)

Labor force (in millions)

Employment status	Fourth quarter			Net change, fourth quarter	
	1951 (actual)	1952 (projected)	1953 (projected)	1951-52	1952-53
Total labor force ¹	66.5	67.7	69.6	1.2	1.9
Employed, total.....	64.8	66.3	68.4	1.5	2.1
Defense.....	8.8	11.3	11.8	2.5	.5
Armed forces.....	3.4	3.6	3.7	.2	.1
Civilians.....	5.4	7.7	8.1	2.3	.4
Nondefense.....	56.0	55.0	56.6	-1.0	1.6
Unemployment.....	1.7	1.4	1.2	-.3	-.2

¹ Total labor force and armed forces figures are not entirely comparable with Census Bureau estimates available through 1950, which exclude approximately 150,000 members of the armed forces.

Increased manpower may be obtained by lengthening the workweek, but the projections of labor needs have been based on the assumption that average hours of work in manufacturing plants will rise gradually

to 41.3 hours in the fourth quarter of 1952. According to the Department of Labor, the factory workweek can be lengthened if necessary, but there are major drawbacks; not only does manhour output tend to decline as the scheduled workweek goes beyond 40 hours, but also accident and absenteeism rates tend to rise.

New Workers in Industry

Unemployment is already at a low level nationally. New workers must be recruited from such groups as women without young children, older persons, adolescents, and the rehabilitated. The health problems incident to the employment of these groups were a major topic of discussion at last year's Congress on Industrial Health of the American Medical Association. At that time, Dr. Jean Spencer Felton, medical director of the Oak Ridge National Laboratory, discussed the importance of utilizing these groups and showed how management's attitude toward their employment has changed in spite of their special health needs.

Women in Industry

Women without young children are the largest single source of additional workers. In March 1951, there were about 18 million women aged 20-64 who did not have children under age 6 and who were not in the labor force, including about 5 million with some work experience during the past decade. (173) In the labor force, married women outnumbered single women almost two to one; the 18.6 million women 14 years of age and over then employed included approximately 50 percent of all single women and slightly more than 25 percent of all married women in the United States.

In her 1951 Labor Day message, Frieda S. Miller, director, Women's Bureau, U. S. Department of Labor, stated that, during the previous year, more women had entered the labor force than men had left it to enter the Armed Forces. In discussing the greater use of womanpower as the defense industry increased, Miss Miller urged that we review our experience in World War II in order to benefit from the lesson it had taught. Productivity was high and turnover and absenteeism among women were low, in plants situated in communities that recognized a need for special services for women workers. According to the Women's Bureau, efficient utilization of women in the labor force necessitates their effective recruitment, placement, and training by industry, and the provision by communities of those facilities and services which enable women, especially those with home responsibilities, to leave the home and go to work.

Older Workers

Postponing retirement and returning retired workers to industry will also make a major contribution to the manpower supply. At the end

of 1951, the proportion in the labor force of men aged 55 years and over was significantly lower than in earlier postwar years. According to an estimate of the Bureau of the Census in March 1951, there were 4.5 million experienced men and women 45 years of age and over in the labor reserve. Among those past 45 years of age, there were about 300,000 skilled craftsmen, a group for which there is the most urgent current and anticipated demand. Of the total, about 200,000 were 65 years and over. A report by the Bureau of Labor Statistics on the employment and economic status of older men and women states that "major needed additions to manpower supply could be achieved by bringing back into the work force qualified older men and women with previous work experience. Retraining and careful placement will contribute to their maximum utilization. Moreover, the need for additional new workers can be minimized by encouraging the retention of workers who reach retirement age." (178)

According to the late Dr. Joseph W. Mountin, chief of the Bureau of State Services of the U. S. Public Health Service, training for new and perhaps less strenuous types of work should begin well in advance of the ages when occupational changes may be desirable or necessary. Industry has a tremendous opportunity to retain the loyalty and experience of its older workers through a process of retraining and gradual change-over to jobs that will suit individual ages and capabilities. Dr. Mountin indicated that studies tend to prove that older workers have fewer accidents and spend less time away from their jobs than other workers. While it is true that more specific measurements of the work capacities and abilities of older people are needed, it is also true that there are few jobs for which the mature citizen cannot be trained or conditioned.

As workers grow older, the responsibility of medical personnel at their place of employment increases, particularly that of the industrial nurse who is often the only full-time representative of the health professions. Keeping the older worker on the job is the subject of a series of articles by Miss Winifred Devlin, industrial nursing consultant, Division of Occupational Health, U. S. Public Health Service, in *Occupational Health*.

The Rehabilitated

Charles E. Wilson, while director of the Office of Defense Mobilization, stated, "The handicapped have proved that their abilities outweigh their disabilities. To fail to put them to work on jobs for which they are qualified is a waste that this Nation cannot afford." Mary E. Switzer, director, Office of Vocational Rehabilitation, states that there are now 2 million handicapped persons who could be returned to the labor force and that the services of an additional 250,000 are lost to employment each year unless they receive rehabilitative services.

A report to the chairman of the Manpower Policy Committee of the

Office of Defense Mobilization, by the Task Force on the Handicapped, states that the present scope of work for the rehabilitation and employment of the handicapped is glaringly inadequate. "In many types of employment," the report states, "a man works on a part of a job. Many machines can be operated by the blind; they do some jobs better than the sighted. Many jobs are done while sitting and are easily done by those with heart trouble or circulatory difficulty of the legs. . . . The idea of disability itself is outmoded. When a specific 'disability' does not in truth disable, the 'disability' ceases to be a disability. Yet there remains the question of securing acceptance of this changing concept by employers and the public." The report points out the importance of the human equation in matters affecting the handicapped. Employers or personnel officers who are primarily interested in getting on with a job may not care to assume personal responsibility for the rehabilitated. In a large company, those in authority may be restricted by regulations; in a small firm, they may wish to be free to use a person for various activities if the need arises. According to the report, various factors may influence the amount of cooperation the employer is able to give, but nearly all employers will assist in the placement of the rehabilitated when they are wisely approached and given the facts.

According to Dr. Howard A. Rusk, chairman of the Health Resources Advisory Committee, National Security Resources Board, numerous objective studies have shown that the rehabilitated worker, placed in the right job, is not only as safe and reliable as the nonimpaired worker but also is frequently more productive. He estimates that 10 percent of the working population have significant physical impairments that must be taken into consideration in job placement and that more than 90 percent of this group are employed.

During the fiscal year 1951, 66,000 disabled men and women were rehabilitated. An additional 14,500 who had received services were employed but still under observation, and another 13,000 were ready for placement in jobs. This was the highest record in the 31-year history of the program and the fourth consecutive year in which a new high mark was set. (45)

Distribution of the Labor Force by Size of Plant

Reports on distribution of the labor force by the Bureau of the Census and the Bureau of Old-age and Survivors Insurance show the extent to which full utilization of manpower will depend upon the cooperation of small plants of all types and in every section of the country. See appendix tables 1, 2, and 3.

The following summary of data compiled by the Bureau of Old-age and Survivors Insurance shows that in the first quarter of 1948, over

99 percent of the reporting units with wages taxable under the program had less than 500 employees and that approximately 70 percent of the total employees in reporting units were in these small plants:

Size class (number of employees)	Reporting units		Workers	
	Number (in thousands)	Percent	Number (in thousands)	Percent
All units.....	2,734.2	100.00	35,805	100.00
1 to 49.....	2,637.9	96.48	14,219	39.71
50 to 499.....	88.9	3.25	11,085	30.96
500 to 999.....	4.4	.16	3,012	8.41
1,000 and over.....	3.0	.11	7,489	20.91

Annual Bureau of Census surveys of manufacturing establishments show a very similar distribution of employees. Moreover, the preliminary estimates based on the 1950 census survey indicate that during the last three years the percent of employees in plants with less than 500 workers increased slightly.

Need for Employee Health Programs

Extent of Sickness and Disability

Sickness and disability not only cut down a worker's earnings but also reduce the national output. Actually the full extent of the loss is incalculable, since absenteeism represents only a portion of it. Ill health, like the iceberg to which it has been compared, goes far beneath the surface and only the visible portion can be measured. The loss resulting from the "submerged" portion of our industrial health program is far greater than is realized. According to a recent estimate by Barkev S. Sanders, the wage-loss alone, due to total and partial disability, probably exceeded \$21 billion in 1949.

A Census Bureau survey, in February 1949, showed that on an average weekday there were in the civilian noninstitutional population of the United States 4,569,000 persons from 14 to 64 years of age who were unable to work or follow their customary activities because of illness or a disabling condition. Approximately 48 percent of these individuals had been disabled for three months or less. In fact, a large portion of the illnesses had lasted one week or less. A study of annual absences among employees of a public utility company, during 1946-50 inclusive, made by Dr. William M. Gafafer, principal statistician, Division of Occupational Health, U. S. Public Health Service, also shows the large number of short-duration absences which occur among both male and female workers and indicates the great predominance of absences due to sickness. See appendix tables 4, 5, and 6.

During 1950, 40 million man-days of work were lost because of temporary disability resulting from industrial accidents which occurred dur-

ing that year. See appendix table 8. But this loss along with that due to occupational disease represents only about 10 percent of the total 400-500 million man-days of work estimated to be lost yearly as the result of temporary disability due to industrial and nonindustrial sickness and accidents.

Non-occupational disability, according to Dr. Robert Collier Page, medical director of the Standard Oil Co. of New Jersey, is, without question, one of the most important problems confronting management at the present time. In his opinion, the incidence of non-occupational disability in any industrial concern is a measure of the adequacy of management and employee relations, over-all efficiency, and basic morale.

In its publication, *Maximum Utilization of Employed Manpower: A Check List of Company Practice*, the Department of Economics and Social Institutions, Princeton University, states that excessive absence from work is in large measure related to such factors as high earnings, employees new to industrial employment, home responsibilities (especially in the case of married women), longer hours, fatigue, boredom, strain, illness, and lack of appreciation of the importance of the job.

Disability was a serious business problem during World War II and is with us again. At the end of the first quarter of 1951, the accident frequency rate for all manufacturing establishments had already increased 16 percent over the rate of the corresponding period in 1950.

A comparison of the frequency of sickness absenteeism during two 4-year periods, 1942-45 and 1946-49, among male employees in companies participating in a joint Industrial Hygiene Foundation-U. S. Public Health Service study, shows that for sick absenteeism of eight days or longer, the rate was generally from one-fourth to one-half again as great during World War II as in the postwar period. The higher rates were due primarily to the respiratory diseases, the frequency of which in some instances was almost twice the corresponding postwar rate. (52)

Disability in Small Plants

Figures included in a recent panel discussion of small plant health and safety problems (*National Safety News*, October 1951) indicate that the accident frequency rate for small plants is about $2\frac{1}{2}$ times as great as in large plants: large plants, 8.95; medium plants, 17.30; small plants, 22.50. Among the important items included in the discussion was the fact that the manager of a small business is commonly his own foreman, production manager, and personnel manager, and this makes it difficult for him to pay close attention to details. As a result, he often overlooks accident and health problems, and feels that he has solved his safety problem when he purchases workmen's compensation insurance as prescribed by law. Another item which

the group pointed out was the fact that many employees in smaller plants must, of necessity, perform jobs which are not a part of their regular assignment. Therefore, these employees need adequate instruction and protection. The problem is to get the manager of a small business to realize the cost to him, to his business, and to his employees, from such items as interrupted production due to accidents, the cost of replacing an employee, the problem of breaking in a new employee, lowered efficiency, delayed deliveries, cancelled orders, loss of customer good will, and lowered morale.

In late 1951, a Labor, Commerce and Public Health Service Task Force for the Health Resources Advisory Committee of the Office of Defense Mobilization completed recommendations for further strengthening of health and safety standards for employers coming under the provisions of the Public Contracts (Walsh-Healey) Act. These recommendations were approved by the committee and by Charles E. Wilson, then director of the office. The committee recognized the special need for safety and health measures in small industries. It estimated that sickness absenteeism in industry, now reducing the labor force by 2 million man-years, can be cut in half, and that another million man-years can be added to the work force by careful medical-employment teamwork in matching every job applicant to a job he can do well and safely. After consultation with medicine, labor, and management at the national level, discussion will revert to focal points in the states, with county medical societies and local industrial and labor groups carrying responsibility for the initiation of effective local programs in 1952.

Trends in Employee Health Programs

A chronological review of events and of statements relating to employee health demonstrates the extent to which management, labor, the medical profession, and both public and voluntary health agencies have increased their understanding of and interest in employee health problems. Healthy workers are not only industry's greatest asset, they are equally important as a national resource. In view of this, Dr. Robert B. O'Connor, assistant professor of industrial medicine at Harvard University and division medical director of the Liberty Mutual Life Insurance Co., suggests that the old adage "production comes from people" be changed to "maximum production comes from healthy people."

Industry has three important elements—methods, material, and men—and the successful plant is the one that develops the best combination of the three. Among industries of the same kind, methods and material are quite likely to be similar; men, according to Dr. O'Connor, are the major variable determining the relative degree of success of the plant.

In addition to services available to employed groups through other voluntary and governmental agencies, there are four types of programs associated with many industries which provide assistance to the employee in time of illness or injury: in-plant health programs, voluntary health insurance, workmen's compensation and temporary disability programs. Workmen's compensation laws now exist in all States; four States now have temporary disability insurance laws; the other programs are found to varying degrees in large and small plants. Appendix table 12 gives details on the existence of various types of programs.

In-Plant Health Programs

The passage of State workmen's compensation laws, which put the responsibility for medical care of the injured worker upon the employer, led to the development of industrial medicine. Originally, injured workers were sent to doctors outside the plant, but as plants grew in size and as industrial medicine continued to develop, some plants—principally the larger ones—began to provide health service through doctors and nurses employed to serve at the plant full- or part-time, depending upon the type of work and the size of the plant. The scope of in-plant health services was later extended to provide protection against occupational diseases.

The health services in many plants have now been broadened to include services to prevent nonindustrial illnesses and to provide treatment for minor nonoccupational illnesses and injuries. Industry has

always been eager to reduce absenteeism and labor turnover because they hamper production. When it was learned that illness of non-occupational nature accounted for more than 90 percent of all absenteeism due to illness, it became apparent that in-plant medical programs should concern themselves with such illnesses.

This broader concept of maintaining and improving the health of the worker is in keeping with the recent realization on the part of the medical profession that there is a distinction between optimum health and the absence of illness, and that the total patient should be treated rather than a specific symptom or condition. As Dr. Rutherford T. Johnstone pointed out, industrial medicine contends that we must cease looking upon the working man as an 8-hour day problem in which only his occupational environment is of concern. "Man's work," he said, "is related to his home, his social environment, his philosophy, his economics, and his happiness." The importance of the social sciences was also emphasized by Dr. Raymond Hussey when he compared occupational health to a three-legged stool, with one leg representing medicine, the second engineering and chemistry, and the third the social sciences. He believes that all three legs are necessary and that balancing on two, and sometimes on one, leads to fatigue and failure.

Dr. Leonard A. Scheele, surgeon general, U. S. Public Health Service, in discussing occupational health as a new frontier in public health, recently stated that the earlier concept of industrial health had broadened to include the total health of industrial employees. "Modern industry," he stated, "is the logical partner of the health department in bringing to workers and their families all of the new and rapidly growing knowledge for preventing illness and improving health." Section II includes a description of various methods used by small plants in providing health services.

As recently defined by the Council on Industrial Health of the American Medical Association in its report on manpower conservation, the functions of an adequate industrial health service should include:

1. Pre-placement examinations.
2. Periodic health examinations, especially of those exposed to occupational disease hazards and of those who need special follow-up.
3. Treatment of all occupational injuries and diseases as required by statute.
4. Reasonable care and advice for nonindustrial injuries and illnesses occurring while on the job. For further care, employees should be referred to their own physicians.
5. Adequate records and analysis of the health experience in order to point out future objectives.
6. Collaboration with management in the provision of healthful working environment.
7. Collaboration in an active safety program.
8. Health education for employees.

9. Coordination with community health activities.

Recognizing the wide variation in existing programs and the need for promoting and standardizing well-organized in-plant health services, the American College of Surgeons, in 1926, organized a Committee on Industrial Medicine and Traumatic Surgery. After a thorough investigation, the committee formulated a minimum standard for medical services in industry, which applies to all industrial organizations regardless of size. Upon request, a representative of the college made a survey of the medical department without expense to the company. A certificate of approval was granted to any establishment in which the medical organization and service were fully approved and were of such a nature as to give reasonable assurance of continued compliance with the minimum standard. Since 1931, when the application of the standard was begun, more than 2,000 establishments with over 6 million employees have been surveyed; of these, about 60 percent have been fully or provisionally approved. (72) In May 1951, the college transferred its survey and appraisal services to the American Foundation of Occupational Health, a trust established by the Industrial Medical Association. In this transfer, the basic principles and standards as originally formulated remain essentially unaltered.

Anyone contemplating the establishment of an in-plant program will profit from a careful review of the minimum standards and the working principles of an adequate medical service given in full in exhibits 8 and 9, appendix.

Dr. O'Connor has listed the following four "musts" for an effective small plant program, but the elements apply equally to programs of all sizes. The first important requisite is a genuine interest on the part of the physician and nurse in industrial health and especially in the development of the preventive aspects of a plant health program. This presupposes that the medical program is built to meet the specific medical needs of the plant and that the personalities of the medical staff are such that the employees will go to them with their problems.

The second requirement is that the medical service must come into the plant. The best interests of the employees cannot be served by a physician who comes into the plant at irregular intervals or whose visits to the plant are so brief that there is no opportunity for him to learn of the particular problems affecting employee health or for the employees to have free access to him and to gain a feeling of confidence in him. The worker needs to feel that the medical program is *his* medical plant program and that the doctor and the nurse are *his* plant doctor and nurse.

The third requirement listed by Dr. O'Connor is the interest and support of management. He says that these are vital to the development of an effective program and that he knows of no instance in which a program has reached effectiveness without the real interest and support on the part of management.

The fourth requirement is that the prime aim of an in-plant health program must be the good of the employees. Although the savings which will result from an employee health program are considerable, a program conceived and pursued wholly in management's interest is short-sighted and will never become fully effective. The benefits to management must come indirectly from a program that is developed primarily for the benefit of employees and is designed to maintain the health of each individual worker. An in-plant medical program will pay dividends to both the employee and the employer when it prevents disease and injury by establishing medical supervision over industrial materials, processes, and environments; conserves employee health through physical supervision and education; and by prompt and efficient care, prevents or reduces time lost because of accident and disease, both industrial and non-industrial. (120)

It is interesting to note that many of the principal defects of medical services in industry, as summarized by the American College of Surgeons, reflect the lack of one or more of these four essential elements. The college also lists defects such as the indiscriminate use of first-aid kits, the lack of written procedures for handling cases during the physician's absence, and the lack of adequate and confidential medical records. (Exhibit 11.)

As the result of the increased scope of in-plant health programs and the emphasis on employee health, both employees and their family physicians now have a much greater appreciation of the extent to which services at the plant protect the general health of the employee. This protection is accomplished not only through prompt and efficient emergency care, but also through referring the employee to his own physician when this is thought to be desirable. An exchange of information between the family physician and the plant medical department is one of the most important parts of an in-plant program. An ideal situation exists where the medical department, with the consent of the employee, makes known to the family physician the results of pre-employment and periodic physical examinations, laboratory tests, and other items of information which will be helpful to him; and where the private physician, in turn, consults with the medical department when he suspects that an illness he is attending may have an occupational origin or when his patient's health can be preserved or improved through services at the plant.

The interest of the private practitioner in his patient should not cease until he has been properly returned to his job, and the medical department can be one of his most valuable allies in effecting proper rehabilitation. In the majority of cases, the medical department must take the initial step by making physicians in the community aware of services available at the plant. One of the best methods of promoting and maintaining a satisfactory relationship is through the regular use of forms, one for referring the employee to his physician and another for

the physician to report to the plant medical department concerning treatments which he would like the patient to receive. These forms appear in the appendix exhibit 22.

The present attitude of both employer and employee toward the pre-placement examination indicates the extent to which both now realize that employee health is the major objective of an in-plant program. The employee has less fear of these examinations because he understands that the results will be used in fitting him to a job that he can perform. The small number of rejections resulting from pre-placement examinations is shown by a comparison of the results of studies made in 1924, 1930, 1940, and 1951. In 1924, about half of the companies reported that they rejected 5 percent or less of job applicants; in 1951, about 81 percent of the employers reported this low rejection rate. At the other extreme, in 1924, 17 percent of the companies reported that they rejected between 11 and 50 percent of all applicants; in 1951, only 5 percent of the firms studied reported rejection rates as high as 11 percent or more. Details of the findings of these four studies are given in appendix table 23.

Education is one of the most important elements in an in-plant health program. As it is practiced today in industry, health education is concerned with the promotion of health—as contrasted with the earlier, more negative efforts which concentrated on prevention of disease. The idea of positive health implies constant improvement and is concerned with the mind and the spirit as well as the body. To be effective, health education must not only teach employees how to improve their personal, family, and community health, but it also must convince them that almost everyone can improve his health and that it is worth paying the price—in time and effort and perhaps in cash. As one writer put it, “A few people worry about health, more people talk about it, and everyone wants it. The trick is to help people to do something about it for themselves.”

The industrial nurse and physician have unusual opportunities for health guidance. The pre-placement examination, followed later by periodic examinations, affords them an opportunity to interpret the findings to the employee and to provide him with general health information concerning early recovery and the prevention of disease. Dispensary visits, plant tours, and other contacts with the employee are opportune times to discuss with him personal habits that influence health, such as sleep, rest, recreation, cleanliness, and good nutrition, as well as any specific problems.

Health attitudes and practices are also promoted through various other means, such as the use of health literature, posters, articles in house organs, lectures, group counseling, special classes, exhibits, and motion pictures.

Regardless of the type of program that is planned, it is desirable that representatives of both employees and management cooperate with the

health personnel in the initial planning and in the continuing promotion of the program. Employee representatives, foremen, and other supervisory personnel are in a strategic position to explain and promote interest in plant health programs.

The effects of a successful health education program also extend to the worker's family and community. As Dr. E. C. Holmlund has recently stated, if a worker is impressed with the value of the pre-placement and periodic examinations that he receives in the plant, he is more likely to encourage his wife and children to visit their physician regularly to benefit from early diagnosis and preventive measures. Parents are also helped to realize the value of school health programs and are stimulated to take more interest in supporting better school and community recreational facilities.

In his report to the Health Resources Advisory Committee to the Office of Defense Mobilization, Dr. Seward E. Miller, chief, Division of Occupational Health, U. S. Public Health Service, proposed a long-term plan which would extend the scope of industrial health services and build up adequate programs designed to protect the great majority of workers. The development of a program of this type would require the understanding and cooperation of management, the employees, the medical profession, the universities, and other groups directly concerned with the health of employees. According to Dr. Miller, such a well-developed program would:

1. Demonstrate to industry, labor, and the public the advantage and benefits accruing to each.
2. Seek to improve the status and salaries of health workers.
3. Develop techniques for bringing these services into small plants.
4. Secure subsidized training for urgently-needed personnel and establish their essentiality.
5. Provide for necessary research.
6. Fully develop the generally weak official industrial hygiene units.

Dr. Miller stated that, in view of the rich returns that will accrue to industry, labor, and the public from the full utilization of industrial health services, a concentrated effort to establish such services covering all workers in industry is long overdue.

Voluntary Health Insurance Plans

Voluntary health insurance has been defined as a voluntary method of spreading the costs of medical care over groups of individuals and periods of time. Through predetermined periodic contributions, participants in insurance plans receive specified medical services or cash reimbursement for all or part of the medical expense they incur during an illness.

In its broader sense, the term voluntary health insurance can be used to denote (a) disability insurance, which provides partial reimburse-

ment for wage loss in the event of illness, and (b) medical care insurance, which protects members against part or all of the direct cost of illness. As commonly used, the term refers to medical care insurance providing either cash or service benefits for non-occupational accidents and illnesses through insurance companies or non-profit prepayment plans, and that is the sense in which it is used here.

Employed groups form the nucleus around which voluntary health insurance has been developed. The first prepayment plans were established in the mid-nineteenth century with the primary objective of making medical services available to employees engaged in hazardous occupations or located in remote places and to their families.

The first major industrial plan—the hospital department of the Southern Pacific Railroad—was organized in Sacramento, Calif., in 1868. It is still in operation. Other early railroad programs now operating are the Missouri Pacific Hospital Association, established in 1872, and the Northern Pacific Beneficial Association, formed in 1882. The Tennessee Coal, Iron & Railroad Co. medical plan at Birmingham, Ala., initiated by the late Dr. Lloyd Noland in 1913, is an outstanding example of the early health insurance programs.

Examples of other industrial prepayment programs are those of the American Tobacco Co., which has programs in operation in five or more States; the American Cast Iron Pipe Co. at Birmingham, Ala.; the Consolidated Edison Co. in the city of New York; the Milwaukee Public Service Companies and the Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Some of these programs are now under collective bargaining agreements.

The factors which led to the establishment of the first prepayment plans—those directly associated with industry—also influenced the type of benefits they provided. Regardless of the method by which these programs were financed—whether by employer, by employee, or jointly by employer and employee—the majority of them offered the patient some form of medical care as it might be needed in his home as well as in the physician's office and in the hospital. Most of the plans associated with industry employed one or more physicians on a full- or part-time basis, some owned their hospital facilities, and a limited number included visiting nurse service and dental care among their benefits; medical service for workmen's compensation cases was frequently provided by the same medical staff but not as part of the prepayment program. (92)

A recent extensive survey by the Division of Research and Statistics, Social Security Administration, shows that a number of the older-type programs are still in operation but that few new ones have been formed. About two million persons are eligible for care under them; of these 1.2 million are entitled to receive physician's care in the office, home, or hospital. See appendix table 11. One might assume that this type of program which provides service rather than cash benefits would be

found only among the larger establishments, but this is not the case. Of the 44 industrial medical care programs included in the study, 18 had fewer than 500 and 26 had between 500 and 1,000 employee-subscribers. The subscribers probably represented a large proportion of all employees in the establishments having these prepayment programs. (24)

The citizens of the United States are insurance-minded, but it was not until the early and mid-thirties that it was possible for employed groups to obtain protection without establishing their own programs. Since then voluntary health insurance has had a spectacular growth and at present more than half the people in the United States are estimated to have some form of voluntary health insurance. See appendix table 10. Most of them are enrolled in Blue Cross hospital plans or Blue Shield medical society plans or are covered by group contracts sold by insurance companies. The majority of these programs were established during or subsequent to World War II. Although they differ in many respects from the older-type plans, they, too, have developed chiefly through enrolling groups of employed persons.

As contrasted with the earlier programs, Blue Cross, Blue Shield, and group contracts sold by insurance companies provide protection chiefly against catastrophic illness cared for in the hospital. In general, the physicians' services, when covered under the plan, are limited to surgery and obstetrical care. Physicians continue in private practice, and the patient has free choice of hospitals and physicians associated with the plans. However, on several occasions recently, people in authoritative positions, including officials of Blue Cross and Blue Shield plans and insurance companies, have stated that they were in favor of expanding benefits under prepayment programs.

The American Medical Association, in cooperation with representatives of consumer sponsored plans, has developed a set of principles for the guidance of persons interested in developing lay sponsored voluntary health insurance plans. These are given in the appendix in exhibit 1.

Under the authority of resolutions of both the Eighty-first and the Eighty-second Congress, the U. S. Senate Committee on Labor and Public Welfare recently issued a report, prepared under the direction of Dr. Dean A. Clark, director of the Massachusetts General Hospital, on the status, methods of operation, types, potentialities, and problems of health insurance plans in the United States. The letter transmitting the report speaks of the growth of medical care insurance as one of the most significant social developments in recent years. The report itself substantiates this statement and presents illustrations of the importance of health insurance to the worker and his family.

The Senate Committee report showed that in 1949 the programs providing physicians' care in the office, home, and hospital, and hospitalization paid more than 80 percent of the average costs to members for services of physicians and general hospitals. The Blue Cross hospital

plans paid from 70-80 percent of the average hospital bills of their participants; during the same year, the committee report states that insurance companies paid from 45-55 percent of the average hospital bills of policy-holders enrolled under individual or under group policies. The Blue Shield and similar plans paid about 45 percent of the average total physicians' charges to their plan subscribers. Group and individual insurance company policies paid about 46 percent of the average total of physicians' bills for policyholders having both surgical and limited medical care insurance. For group policyholders with surgical insurance only, about 29 percent of the average total of their physicians' bills was covered; the comparable figure for individual policyholders was 22 percent under such programs. (35)

Enrollment in voluntary health insurance has grown rapidly as a result of the inclusion of health and welfare clauses in collective bargaining agreements. The Bureau of Labor Statistics reported that by mid-1950 at least 7.7 million workers were covered by collective bargaining agreements providing pension or social insurance benefits of some type—life, accident and sickness, hospitalization, or surgical and medical care. Nearly all major unions in the country had negotiated, to some extent, pension or "health and welfare" programs. A total of 4.8 million workers had some hospital protection, and 4.4 million had some form of medical protection. (180)

Unions are working for more extensive medical care for members and their families. Mr. Harry Becker, director of the UAW-CIO Social Security Department, has stated recently that organized labor working alone cannot achieve this goal, and that the medical profession and public health specialists must furnish technical leadership in the development of expanded medical services. The unions already have been instrumental in obtaining more extensive benefits in prepayment hospitalization plans, such as an increase in the number of days of coverage and inclusion of many additional services. Blue Cross, with the support of management and labor, has now arranged for national or uniform coverage as well as for more liberal benefits.

The managers of small plants will find that voluntary health insurance makes a most effective addition to in-plant health benefits, especially when the services they provide are expanded, as many leaders of management, labor, and the medical profession are now urging. The benefits provided by these two programs complement each other, the one emphasizing preventive service and case-finding and the other removing financial barriers to the correction of defects found.

Workmen's Compensation

The development of in-plant health programs, especially in the larger industries, has been stimulated to a marked degree by the passage of workmen's compensation legislation, and the liberalization of

many of these laws to include most or all illnesses arising out of employment. Estimates indicate that roughly three out of four civilian wage and salary workers are now covered. For the most part, industrial workers who are excluded from coverage are engaged in less hazardous occupations or work in establishments where only a small number of employees are involved. The amount paid for medical services under these laws and the types of illnesses covered by them indicate their importance to the in-plant programs.

Workmen's compensation payments increased from \$235 million in 1939 to \$618 million in 1950. These amounts include both cash compensation in disability or death cases and the cost of medical and hospitalization benefits. They do not include other direct costs to the employer for occupational injuries and illnesses. The amount of such additional direct costs is not known, but a report of the Subcommittee on Accident Costs of the President's Conference on Industrial Safety states that "a conservative estimate places the direct employer cost at over \$600 million annually." This was in 1946 when payments amounted to \$435 million. (100)

The increase in workmen's compensation payments during the 12 years 1939-50 was due to the expansion of the labor force protected by the program, the rise in wage rates on which benefits are based, and liberalization in the cash and medical benefits provided by the law. In at least 14 States, the provisions for medical care provided by workmen's compensation laws are unlimited as to time and amount, while, in 14 other States, the limits prescribed by law may be waived by action of an administrative agency. In actual experience, statutory limitations are frequently waived voluntarily in the remaining States. (70)

For the past 5 years about one-third of the workmen's compensation payments have been for medical care and hospitalization. These benefits represent 36 percent of 1939 payments and 37 percent of 1940 payments. Medical care and hospitalization payments accounted for decreasing proportions of the total during the war years. It is estimated that these payments amounted to \$85 million in 1939, \$125 million in 1945, and \$200 million in 1950. (100)

Since 1910, all States, Alaska, Hawaii, and Puerto Rico have enacted some form of workmen's compensation legislation. Of the 54 State, Territorial, and Federal workmen's compensation laws now in effect, 42 were amended in one or more respects during 1951. These changes included liberalization of benefits, coverage of additional employments, measures designed to facilitate rehabilitation, increased coverage of occupational disease, and the broadening and creation of second-injury fund provisions.

The maximum weekly disability benefit was increased 20 percent or more in eight States. Twenty-two States and Hawaii broadened their coverage by adding employments to the list of occupations covered or

by removing specific exemptions for certain workers or employers. Four States adopted new measures and one amended existing legislation dealing with rehabilitation for workmen's compensation cases. (57)

Thirty out of 54 State and Territorial workmen's compensation laws now provide full or general coverage of occupational diseases; 18 States and Puerto Rico limit their coverage to specific diseases, with the disease schedules including only two or three diseases in some States and more than 40 diseases in others. A table showing occupational disease coverage by State in January 1952 is shown on page 155.

The increasing tendency to general coverage of occupational disease has been an outstanding development in the workmen's compensation field during the last few years. In discussing this tendency, J. J. Bloomfield, formerly sanitary engineer director, Division of Occupational Health, U. S. Public Health Service, recently stated that experience of more than 25 years with full coverage laws, such as those operative in California and Wisconsin, has conclusively proved that full coverage is no more expensive than limited coverage. In most States, according to Mr. Bloomfield, occupational disease costs account for only a small proportion of the total workmen's compensation cost; in Wisconsin in 1946, the costs of occupational diseases and nonaccidental injuries were 4.8 percent of the total; in Illinois during the period 1935-45, they were from 1.6 to 1.7 percent of the total costs; in New Jersey, they accounted for 3 percent.

To stimulate greater interest in accident prevention, the State of Nevada, in 1951, provided for rebates in workmen's compensation insurance premiums up to 20 percent, or twice the previous rate, to any plant maintaining for 2 years a "high standard of safety or accident prevention as to differentiate it from other like establishments or plants." Rebates up to 30 percent, or twice the former rate, are specified for plants which maintain such standards for more than 2 years.

Temporary Disability Insurance

The existence of temporary disability laws in four States and the possibility of the passage of additional State laws of this type may prove to be a stimulus for the development of more in-plant health programs. Within the past few years 35 States have given consideration to temporary disability legislation.

Employers in the four States now having such legislation, Rhode Island, California, New York, and New Jersey, have an increased awareness of the value of in-plant services and the benefits to be derived from assisting their employees to obtain medical services under voluntary and community health programs. Under State disability programs, the worker is provided partial compensation for wage loss resulting from non-industrial illness. Because the tendency in State legislation is for the employer to pay part of the cost of the program,

he has an additional financial interest in keeping his workers well and on the job. However, this may result in a stricter pre-placement examination to eliminate those with various chronic ailments who may have greater than usual periods of illness, thus militating against full use of our older and handicapped workers.

Just as the workmen's compensation laws now operating in all States have stimulated the development of safety practices, these temporary disability insurance laws will increase management's interest in developing more extensive in-plant programs, in expanding voluntary health insurance plans to include preventive and diagnostic services, and in promoting additional and more adequate public health service. It is of interest to note that Rhode Island, which passed the first temporary disability law, recently added legislation requiring each industry with as many as 400 employees to have at least a full-time nurse on duty. The law also prescribes the first-aid provisions required of the smaller plant.

An example of the size of these existing State programs is indicated by the fact that in the calendar year 1950 California workers paid about \$67 million in premiums for temporary disability insurance. This program is financed entirely by employee contributions. An estimated 205,000 different individuals received about \$43 million for approximately 1.7 million weeks of disability during 1950. The California law has a unique provision for payment to hospitalized claimants under which, during that year, they collected another \$5 million in hospital benefits. In California during the years 1947 through 1950, contributions in the amount of \$263 million were collected in premiums for temporary disability insurance, and \$132 million was paid out in benefits. (176)

Extent of In-plant Personnel and Facilities

Industrial Physicians and Nurses, United States

In 1950 there were over 2,000 physicians working full time or giving special attention to practice in the industrial health field; 940 of the total limited their practice to industrial medicine, and 1,091 gave special attention to the field. Ten years earlier, only 404 physicians limited their practice to industrial medicine, while 1,204 gave special attention to it. In both years there was a large but unknown number of other physicians devoting some time to industrial practice. (93)

As might be expected, the highly industrialized States are the ones having the largest number of industrial physicians. Only the following seven States, arranged in decreasing order according to the number of industrial physicians, had 50 or more who limited their practice to industrial medicine: New York, Illinois, Michigan, Pennsylvania, California, Ohio, and New Jersey. No full-time industrial physicians were reported in nine States.

About 10,800 registered professional nurses were employed full time in industry in 1950. More than 90 percent of the nurses who reported on the type of service rendered worked in plant medical programs, and the remainder were employed in industrial hospitals, gave home or visiting nurse service, or were employed in personnel departments. The number of industrial nurses is increasing slowly, with 9,000 employed in 1946 and 9,500 in 1948. Over half of the nurses employed in 1950 had been engaged in industrial nursing for 5 years or more.

The following seven States, arranged in decreasing order according to the number of industrial nurses, had 600 or more nurses of this type in 1950: Illinois, Pennsylvania, Michigan, New Jersey, New York, Massachusetts, California. Illinois had 1,300 industrial nurses.

Appendix table 14 contains detailed information for each State on the number of physicians limiting their practice to industrial medicine and those giving special attention to it, as well as the number of nurses rendering various types of industrial nursing service.

Personnel, by Size of Plant

Current information on the number of companies employing physicians and nurses on a full-time and part-time basis is available in a study made by the National Association of Manufacturers and included

in a report of the Brookings Institution. It is based on a survey of 3,589 member companies having a total employment of 3.3 million. Less than 5 percent of all companies included in the survey had full-time physicians, 17 percent had part-time physicians, and 48 percent had physicians who came to the plant when called. Twenty-eight percent of the companies had registered graduate nurses.

Table 1.—Number and percent of surveyed companies in each specified size group reporting services available by physician, nurse, or first-aid attendant, 1950¹

Size group (number of employees)	Number of companies in survey	Physician						Registered graduate nurse		First-aid attendant					
		Full-time		Part-time		Call-basis									
		Num- ber	Per- cent	Num- ber	Per- cent	Num- ber	Per- cent								
All companies ²	3,589	172	4.8	613	17.1	1,725	48.1	1,023	28.5	1,615	45.0				
Less than 251.....	1,901	9	0.5	69	3.6	780	41.0	63	3.3	673	35.4				
251-500.....	617	13	2.1	94	15.2	376	60.9	204	33.1	384	62.2				
501-1,000.....	466	24	5.2	135	29.0	274	58.9	279	60.0	279	60.0				
1,001-2,500.....	356	31	8.7	185	52.1	194	54.6	289	81.4	184	51.8				
2,501 and over.....	200	92	45.5	125	61.9	85	42.1	179	88.6	87	43.1				

¹ Based on a 1951 survey of member companies made by the National Association of Manufacturers. The 3.3 million employees in the companies which responded to the questionnaire included factory, office and executive personnel and represented more than 22 percent of the average number of employees in manufacturing establishments during 1950.

² Total includes companies which did not report number of persons employed.

Source: Bachman, George W., D.Sc. and associates: *Health Resources in the United States, Availability of Personnel, Facilities, and Services*. Washington Brookings Institution 1952. In press.

As has been found in all previous studies, a very small percent of the companies with 250 or fewer employees had the services of a full-time or part-time physician or a registered graduate nurse. The full-time industrial physician is hired almost exclusively by industries having 2,500 or more employees. Practically none of the plants with fewer than 500 employees and less than 10 percent of the plants with 1,000 to 2,500 employees had such full-time service. The graduate nurse was on duty in one-third of the plants having from 250 to 500 employees, as contrasted with 90 percent of the plants having 2,500 or more employees.

Other recent studies show the same wide variation in the availability of physician and nursing service in large and small plants. In Pennsylvania in 1951, less than 1 percent of the small plants had a physician or nurse on duty at any time while, in contrast, 80 percent of the largest plants provided both types of service. A 1948 National Industrial Conference Board Study by Ethel M. Spears and a less recent survey made in New Jersey show even a wider difference in the availability of physician and nursing service in large and small plants. See appendix tables 15, 16, 19 and 22.

The Pennsylvania study also indicates a wide difference in the provision of physician and nursing service by various types of industries.

The chemical and allied products plants and those classified as metal and metal products had a larger proportion of their employees eligible for such service than plants in any other classification. At the other extreme, few employees in plants classified as lumber and its remanufacture or mine and quarry products had service of either type. See appendix table 17. Differences in the availability of physician and nursing service in industries of different types was also reported in earlier studies. (20, 67)

Table 2.—Number of establishments reporting in survey and percent reporting employment of medical personnel, by size and type of industry, New York State, 1950

Size group (number of employees)	Number of establish- ments	Percent employing—			
		Any medical personnel	Physicians only	Physicians and nurses ¹	Nurses only ¹
Manufacturing establishments					
All establishments	2,734	24	2	12	10
100-199	1,443	6	2	1	3
200-499	841	25	2	10	13
500-999	244	69	3	34	32
1,000-1,999	128	92	1	65	26
2,000-4,999	60	90	—	77	13
5,000 and over	18	100	6	94	—
Nonmanufacturing establishments					
All establishments	1,734	17	2	8	7
100-199	863	2	1	—	1
200-499	541	15	2	6	7
500-999	185	45	3	17	25
1,000-1,999	87	66	2	36	28
2,000-4,999	45	84	—	73	11
5,000 and over	13	92	8	84	—

¹ Includes both registered graduate and practical nurses.

Source: State of New York, Department of Labor: *Medical Personnel and Employee Feeding Facilities in New York State Establishments Employing 100 or More Workers*, October 1950. New York, The Department, 1952, pp. 7-10.

A recent survey of medical personnel and employee feeding facilities, which covered almost all establishments in New York State with 100 or more employees, provides information on medical personnel employed as of October 1950. Over 95 percent of the 6,200 establishments returned the questionnaires. One-fourth of the manufacturing plants and one-sixth of the nonmanufacturing establishments reported that they employed some type of medical personnel. According to the survey definition, this count included full-time and part-time physicians, registered and practical nurses. On-call physicians were excluded.

The proportion of establishments employing medical personnel was larger in the manufacturing than in the nonmanufacturing field, 24 as contrasted with 17 percent. The report indicates that the proportion of factories employing medical personnel was greater outside New York

City (36 percent) than in the city (14 percent). More than three quarters of the physicians and nurses associated with manufacturing firms were employed outside New York City. The reverse is true for nonmanufacturing establishments; of the total of 909 industrial medical personnel employed, 794 were in New York City. The other 115 were almost all employed in the large upstate cities.

Details are given by type of industry and it appears that the size of the work force is a more important factor than the type of industry in determining whether a medical unit will be established. The lack of personnel in the smaller establishments is evident from the material in table 2.

Services by Size of Plant

The extent and variety of services available to employees through in-plant programs is much wider in large establishments than in small ones. In the recent survey made by the National Association of Manufacturers, it was found that in 1950 less than one-third of the companies with 250 or fewer employees provided pre-employment examinations, as contrasted with more than 95 percent of the companies with over 2,500 employees. The percentage of companies in these two size groups providing periodic examinations varied from 11 percent to 64 percent; in return-to-work examinations the variation was from 11 percent to 86 percent. There were differences in the extent to which these examinations were provided to factory workers, office workers, and executives. The details are given in appendix tables 18 and 21.

In a Chicago-Cook County study the following information was provided on selected services available to employees in plants that had more than and less than 100 workers: (1) Pre-employment examinations: 58 percent of the employees in the larger plants were examined at the plant, and 25 percent had such examinations elsewhere; in the smaller plants less than 1 percent had examinations where they worked, and 23 percent had them elsewhere. (2) Treatment of plant injuries: In the larger plants 82 percent of the employees were treated at the plant, and 17 percent were sent elsewhere for treatment; in the smaller plants less than 4 percent were treated at the plant, and 81 percent were sent elsewhere. (3) Treatment of minor on-the-job illnesses: In the larger plants 81 percent received treatment in the plant, and 7 percent elsewhere; in the smaller plants 7 percent were cared for at the plant, and 32 percent elsewhere. Information on the provision of a variety of other services is contained in appendix table 20.

Detailed information on the various types of services provided in small plants and the extent to which services are utilized by the employees is contained in the descriptions of small plant programs in section III. A word of caution is needed in the interpretation of this material. It should be pointed out that the variation in the adminis-

tration of these programs, as well as the different methods used in recording services provided, prohibits meaningful comparisons between the programs. However, a review of each program seems to indicate that the utilization of services is considerably influenced by the personality of the physician and nurse, the degree of utilization of the health services by the company officials and their attitude toward the program, the extent to which the employees were consulted in the development of the program, the existence of employee advisory committees, the extent to which community services such as mass chest X-rays are utilized by the plant, and the degree to which the physician in the plant and the physicians in the community have mutual respect for and cooperate with each other.

SECTION II

Type and Extent of Small Plant Health and Medical Programs

Development of In-plant Programs

Definition of Small Plant

In 1941 the Department of Commerce suggested that a small manufacturer might be defined as one with 100 or fewer employees. More recently, according to the Department, there has been a tendency to say that any manufacturer having 500 or less employees is small, but almost everyone admits that any single standard of size is in error. Small size is a relative term; what is large in one industry may be comparatively small in another.

The Department has recently issued a bulletin which indicates the classification of small manufacturers in 452 industries. In a study of the size factor in manufacturing establishments, it found that, in general, the aggregation of establishments which collectively produce one-third of the products in their respective industries comprises the small business concerns. In the report all manufacturing establishments employing 100 or less are considered small, and manufacturing establishments employing 2,500 or more are considered large. In most manufacturing establishments the ones with 250 or fewer employees are considered small. Of the total 452 types of manufacturing establishments included in the study, plants in 321 types of establishments were classified as small if they had 250 employees or less (198 of the 321 were considered small if they had 100 employees or less). On the other hand, in certain types of establishments plants with a much larger number of employees were considered small. In 15 types, a plant could have 2,500 and still be considered small. The Small Defense Plants Administration is in general following the definition of the Department of Commerce.

In this report, plants with less than 500 employees have been considered small. In certain instances, however, information has been included on plants with 500 to 1,000 employees. It was assumed that experience in these larger plants will prove helpful to groups of small plants planning cooperative health programs that cover up to 1,000 or more persons.

Types of Programs

By far the greatest number of small plants that provide any type of industrial health service make use of physicians who do not come into the plant except on call. The major responsibility of these physicians with regard to the plant is to provide medical attention to the injured worker either at the plant or in their own offices; to a lesser extent

they also perform pre-placement and periodic health examinations and assist in the solution of special occupational health problems at the plant. The physicians are usually selected because they are prepared to handle the type of injuries experienced at the plant or because they are conveniently located for emergency calls. One plant may be served by several on-call physicians. Although a large number of physicians perform this type of industrial health service, this work affords them very limited opportunity to become familiar with special health problems at a plant and with employees and their health problems, or to participate in a preventive medical program.

Where small plants have set up their own dispensaries, they are most frequently served by a nurse who is employed full or part time to provide care under the direction of a physician who is on call or who serves in the plant part time. The type of services provided under such arrangements varies considerably and depends to a large extent on the interest of the physician and nurse in preventive health services. In many instances, the physician and nurse who realize the need for extending employee health services beyond care for industrial accidents and illnesses can stimulate management's interest in expanding the scope of the program. The interest of the physician and nurse in the improvement of in-plant health programs will often depend upon the amount of time they spend at the plant and upon the opportunity they have to observe its operation and to confer with each other and with management on employee health needs.

The work in some small plants is sufficiently hazardous to warrant the full-time employment of an industrial physician; actually few small plants do have full-time physicians. In some sections of the country, plants are able to purchase employee health services on an hourly basis from a group of private practitioners who devote full time to serving industries, some specializing in services for small plants. In some localities the insurance companies handling large volumes of industrial work have established centrally located clinics where service is available. In a few cities the unions have established such clinics. Developing an effective program without full-time medical personnel presents many difficulties to small plants, but where they obtain the services of physicians and nurses with an active interest in industrial health and a personality suitable to this type of work the problems can be overcome.

Dr. J. W. Meigs of the School of Public Health at Yale University, speaking at the 1952 meeting of the American Conference of Governmental Industrial Hygienists, listed the following eight types of arrangements under which small firms have obtained in-plant health services:

1. Individual, management-sponsored, full- or part-time in-plant services.
2. Cooperative full- or part-time in-plant services for several companies sponsored jointly by the different managements.

3. Part-time in-plant nursing services sponsored by visiting nurse associations in cooperation with local physicians or medical associations or offered by individual nurses.

4. Part-time in-plant medical and nursing services sponsored by physicians or groups of physicians, usually with a central clinic or dispensary.

5. Central clinic services provided by insurance companies.

6. Services available through union health centers.

7. Services available through health departments.

8. Mobile dispensaries operated by appropriate agencies.

As yet, only a few small plants have sought to meet their health needs by pooling their efforts and establishing their own cooperative health programs. In spite of their limited number, such programs have found favor with management, labor, and the medical profession. The American College of Surgeons recommends this cooperative type of service as a method of bringing adequate service into the small plants at a reasonable cost. Under this type of arrangement, a physician usually serves the employees of several plants either in a centrally located clinic or in the plant dispensaries, each of which he visits regularly according to a time schedule. (72)

The programs described in section III have been limited to cooperative programs and to community projects developed by local groups for the purpose of stimulating health services in small plants. For this reason, most of the descriptions contain information on services available at three or more plants. The few individual plant programs that have been described are the outgrowth of these cooperative or community health programs. A brief review of the organizational patterns of the various programs described in section III shows that a variety of methods has been devised for meeting health needs in small plants.

The Astoria-Long Island City project was a 1-year demonstration program jointly sponsored by the New York State Department of Labor and the New York City Department of Health, under which individual plant programs were established in seven plants. Nursing and diagnostic laboratory services were provided throughout the demonstration without charge by the New York City Department of Health, but each plant paid for its own facilities and equipment and for the part-time services of a general practitioner. In addition to the demonstration program, the current program of the A. C. Horne Co., one of the participants in the demonstration, is described in section III. This company has continued its program, using the services of a part-time physician, and part-time nursing service obtained through the Visiting Nurse Service of New York.

The Hartford Small Plants Medical Service uses the full-time services of an industrial physician who divides his time among the eight

plants now participating in the service. Each firm has one or more full-time nurses, and the physician visits each plant at least twice a week according to a regular schedule. His weekly hours at each plant vary from three to eight, depending upon the hazards at the plant and the number of employees. The description of the Allen Manufacturing Co.'s program gives details on how this program operates in one of the participating firms.

In Georgia, where small plant health programs have stimulated a considerable amount of interest, three different types of cooperative programs have been tried. The Manufacturers' Health Clinic at Winder was established in 1943 to serve six firms through a central clinic. The plant called for the services of a physician, but the acute shortage of physicians made it necessary to begin with nursing service only. This was to be a temporary arrangement, but it is still in effect.

The Griffin Plan, also in Georgia, was established in 1947 and terminated in June 1950, but there is a possibility that it may resume operations. Five public health nurses from the local health department provided services in the seven mills covered by the program. Health rooms were established by management in the mills and were used for community-wide health services as well as for employee health centers. The nurses spent about 34 percent of their time in industry. Nursing services were provided under written standing orders approved by the county medical society, but otherwise no medical supervision was provided.

At the Petrie Clinic in Atlanta, Ga., a part-time physician and a full-time nurse give care to the employees of three nearby firms. The physician spends 2 hours a day, 5 days a week at the clinic. The nurse assists the physician at the clinic and also visits each plant once a day. The cost of the service is prorated among the participating firms according to the number of workers employed and the services provided their employees.

In Pennsylvania, three community projects have been instrumental in developing small plant health programs, two in Philadelphia and one in Williamsport. Under a program sponsored by the Philadelphia Health Council and Tuberculosis Committee, in-plant programs were established in 31 small firms. Several small firms in the same locality and having a combined employment of about 1,000 were grouped together as a unit for the purpose of providing in-plant service. At the beginning of the demonstration, services were provided by physicians and nurses on the staff of the health council; each plant was given on the average 2 hours of nursing and 1 hour of physician's time each week for each 100 employees. As soon as the programs were well established, each unit was turned over to a committee of the plants for administration. Later, when the health council discontinued the demonstration, nursing in some firms was provided by the Visiting Nurse Society of Philadelphia. Descriptions of the current programs of two

firms originally developed under the health council are included in section III.

The Philadelphia Medical Society-Chamber of Commerce Program and the Williamsport Industrial Health Program are both examples of the combined efforts of the local medical society and the chamber of commerce to stimulate the development of health programs. Under each project the services are provided by physicians who usually are in private practice and devote a relatively small amount of time to industrial practice. The descriptions of these projects include data on the operation of several individual plant programs.

In-plant programs were established in three small plants under the New Haven Industrial Medical Service. According to the original plan, a full-time member of the Section of Preventive Medicine of the Yale University School of Medicine was to serve as medical director. The war interfered with the development of the program as planned, but a physician in private practice visited each plant at least once a week for the duration of the program. Nursing service was provided by the New Haven Visiting Nurse Association, one nurse usually serving the three plants, spending about 2 hours a day in each.

Essentials of an Adequate Program

Since the services of an in-plant health program are personal, the value of the program depends to a large extent upon its complete acceptance by the employees. The success of the program also depends upon the backing of management and the sincere interest of the health personnel who are to provide the services. To this end there must be widespread understanding of the purposes, values, and benefits of the program on the part of management, labor, and the medical profession. There should be active participation on the part of these three groups in the development of any employee health program.

Each program must be designed to fit the plant in which it is to function since plants vary widely in the amount and type of medical service they require. Not only must the medical services be adapted to meet the plant's needs, but they must also be coordinated with the plant operating departments to minimize unwarranted expense. It is necessary for the physician and nurse to understand the relation of their work to other procedures in the plant and to adjust time schedules in the medical department to the convenience of the employees, thus reducing time lost from work.

The following factors are among those that must be considered in fitting a medical service to a plant: the number of employees, their age and the percentage of women; the type of industry and the physical demands of the work; production problems relating to health; type and frequency of lost-time accidents; working conditions, the location of

risk, and the toxic exposures and accident hazards in the plant; degree of workmen's compensation losses; the plant location; the labor turnover; the economic level of the employees and their intelligence; absenteeism and its causes; existing medical plans, and the availability of local medical practitioners and of local community facilities. See exhibit 25.

Specific examples of the value of a well-planned program are given in an insurance company publication which cites the experience of one plant with only 600 employees that is spending about \$5,000 on a medical program and has saved approximately twice this sum during the first year because the plan had been built specifically for the needs of the plant and is staffed by the right personnel. In contrast, another plant with 6,000 employees spends approximately \$47,000 a year on a medical program from which neither the management nor the employees appear to be deriving much benefit because the program is not properly planned and has simply grown haphazardly. (121)

Proper staffing of the medical department is extremely important. The physician and nurse must be professionally competent, be ethical in their practice, and have sufficient interest in the employees to win their confidence. Their actions must reflect the basic purpose of an occupational health program; namely, that it is a preventive medical program, developed primarily for the benefit of the employees, with the employer's benefits coming as a by-product. The qualifications of professional personnel and the need for additional training in occupational health is discussed in the sections on physician's services and nursing services, pages 40 to 52.

When small plants join together to provide a service for their employees, the varying needs of each plant must be reconciled and details must be worked out as to ownership of equipment, financing, hours of service, plans for expansion, and the like. See Hartford contract, appendix exhibit 6. In addition, after the plan is in operation, it is extremely important for some individual or small group to give continuity and stability to its management. The Hartford program provides an example of the benefits derived from continuity of interest. This program initially covered six small firms. One company dropped out when its size increased, at which time it decided to employ a part-time physician of its own. Four other small firms have joined since; of these, one discontinued the service when its management changed. In addition to changes in the participating firms, the program had four different medical directors during the first 4½ years of its existence.

One of the industrialists associated with this program has given it unusual support, and it has been through his initiative and leadership that additional firms have been added to the program. Dr. A. S. Gray, at present the deputy commissioner, and previously director of the Bureau of Industrial Hygiene, of the Connecticut State Department of Health, has also provided leadership and has been primarily respon-

sible for obtaining medical directors for the program. Without the active interest of these two individuals it is questionable whether the program would have survived the changes both in participating companies and in medical leadership.

A recent editorial in the *American Journal of Public Health* suggested that another method of providing continuing administrative direction for the development of cooperative in-plant health services is through affiliation with existing group practice units, preferably those having prepayment arrangements. The editorial points out that services should be established with suitable professional advisory boards, so that standardized policies and administrative procedures could be applied where desirable to all medical and health problems arising at the place of employment or elsewhere. In that way, the workers could receive the same or a higher quality of care with better coordination of effort, reduction in cost of service, and more effective prevention of disease and early case-finding.

An example of this type of coordination is found in a prepayment program in the city of New York, Group Health Insurance, Inc. It has set up a committee composed of outstanding experts in the industrial hygiene field who have agreed to give free consultation services to employers whose workers belong to the prepayment plans. The committee advises as to the type of health program best suited to their needs and, when desired, takes responsibility for supervision and direction of an employee health service program. So far the number of requests for services has been disappointing; nevertheless, the proposal offers unusual advantages.

Promotion of Small Plant Programs

The forces that combine to promote in-plant health services vary with each community and depend on several factors, such as the interest of and the leadership assumed by the local medical society, the chamber of commerce, the labor organizations, and the official and voluntary health agencies; the availability of the visiting nurse associations and of trained industrial physicians and nurses; the existence in the community of well-established health programs in larger industries; the existence in the plant of employee benefit programs, including prepaid hospital and medical service; and the location in the community of a teaching hospital or an industrial clinic.

In some instances, the State health department has been instrumental in promoting the development of such services. In others, the program has been fostered through the joint efforts of organizations such as the local tuberculosis association in cooperation with the local chamber of commerce, the local or State health department in cooperation with a leading industrialist, and the local chamber of commerce in cooperation with the medical society. In some cases the personal interest of a

single industrialist, a single physician or a nurse has been responsible for the development of in-plant health services.

Harry Read, executive assistant to James B. Carey, secretary-treasurer, CIO, stated recently that it is impossible to blueprint an over-all plan, because the small plant problem varies from industry to industry, from city to city, and even from block to block within the same city. "I suppose," he said, "a pooling of industrial interests in the field of industrial medical care is necessarily part of the eventual plan. This problem cannot be solved by management or by labor or by government officials working alone, or even working together. They must have the technical assistance of the industrial medical staff in solving it."

Official, State and local industrial hygiene agencies are among those giving earnest attention to the promotion of in-plant health services in small plants. As one means of tackling this problem, several industrial hygiene divisions, including those in Los Angeles and Minnesota, have actively supported demonstrations of small plant services on a part-time basis, utilizing the medical services of health departments. The limited facilities of these departments and the demand for nursing service in other public health fields make it somewhat difficult to promote such demonstrations. (171)

A recent editorial in the *American Journal of Public Health* describes the unusual opportunity offered the local and State health officers in supplying the leadership needed for the development of small plant health programs. The cooperative programs in Georgia are examples of what has been accomplished by one State health department. The Hartford, Connecticut, program is another in which a State health department played an important role, not only in the initiation of the program, but also in obtaining physicians to serve as medical directors of the program.

An article in the *American Journal of Public Health* outlines the organizational and promotional effort made in Connecticut to stimulate the development of small plant programs by the State medical society, organized labor, the manufacturers' association, and the State department of health. Special tribute is paid to the industrial nurses in the State for their contribution in the undertaking.

Several State and local industrial hygiene agencies have cooperated with other groups in promoting small plant programs. The industrial hygiene unit of the Wisconsin State Board of Health, for example, has encouraged the visiting nurse associations to provide part-time nursing service in small plants. For many years it also has actively promoted small plant programs in cooperation with the Committee on Industrial Health of the Wisconsin State Medical Society. Since 1942 it has sponsored special clinics through which physicians, industrial nurses, and plant managers have met together to discuss problems of common interest. During the past six years this program has utilized plants for tours and direct observation of the industrial processes and safety

and health measures employed, and for a study of accident records in selected industries. During 1951, plant tours were held in three communities. According to Dr. J. F. McCahan, assistant secretary, Council on Industrial Health, American Medical Association, the attendance was excellent, interest was sustained, and favorable comments were received. A total of 542 persons, including 233 physicians, 126 industrial nurses, and 183 other persons, including plant managers, attended these clinics. (99)

Where the State and local medical societies have actively encouraged small plant programs, the prestige of the societies has been a valuable asset in arousing the interest not only of industry but also of the general public. The initiation of certain programs in Pennsylvania was largely the result of the able leadership of the late Dr. Charles-Francis Long, chairman of the Pennsylvania State Medical Society, and of local medical societies that joined with local chambers of commerce to promote small plant programs. The descriptions of the Williamsport and Philadelphia Medical Society-Chamber of Commerce programs in section III contain interesting details on the promotional methods used in the initiation of these projects.

One lesson seems clear from the history of the small plant cooperative programs. The establishment of such a program needs the full-time promotional efforts of an energetic, enthusiastic, well-qualified person with experience in industrial health. After the program is initiated, it must have the continuing promotional support of a person whose full- or part-time attention is given to developing interest in health programs among other small plants. If the cooperative programs are to be successful, they must have new members not only to replace the firms that go out of business, lose interest, or expand until they feel the need of their own full-time service, but also to encourage the physician with the prospects of an increasing work opportunity. The source of funds for financing the full- or part-time services of the person responsible for the continuing development of the small plant programs will vary from community to community, but both the financial and moral support of local trade associations, labor groups, medical societies, and voluntary health associations will do much to insure his success. See exhibit 3.

A leading industrial physician in a recent article pointed out the different groups in the community who have a logical interest in small plant programs and whose assistance should be obtained in the promotion and development of such programs. He states that any plan should be based on teamwork and that it should be participated in by both general practitioners and specialists, by nurses, technicians, social workers, voluntary and official public health agencies, hospitals, social welfare groups, and any other organized and trained personnel which can contribute to the physical, mental, and social well-being of those who are gainfully employed. (152)

Methods of Providing In-plant Services

Physician's Services

In his recommendation for auditing the facilities and administration of industry's medical departments, Dr. C. Richard Walmer, managing director of the Industrial Hygiene Foundation, stresses the importance of properly selected professional personnel and states that an entire industrial health program can stand or fall on the type of professional staff charged with its administration. It is important to know more about a plant physician than the college he was graduated from and how long he has been practicing. For example, his social and nationality background is particularly important in some communities where many medical and labor problems can be met with more sympathetic understanding if the physician has a nationality background and early environment similar to that of his patients. It is also wise to know whether the physician belongs to national or local societies and what offices and duties he performs there.

Other factors regarding the physician's services relate to the amount of time the part-time physician spends at the plant, his availability for emergency service at all hours the plant is in operation, and his status with the local hospitals. It is also important to know whether the physician is competent to perform major surgical operations and, if not, to make other arrangements for such services. According to Dr. Walmer, these are not idle inquiries, for the lives of employees may depend upon them.

The American College of Surgeons, whose activities have contributed so much to raising the standards of medical services in industry, lists the following qualifications which not only guide industries in their choice of physicians to serve as plant physicians or as medical directors, but also indicate the wide scope of their duties:

1. He should be a graduate of an accredited medical school and licensed to practice in the State or Province.
2. He should have at least 1 year's internship in an accredited hospital.
3. He should have some experience in general practice either prior or supplemental to his duties at the plant.
4. He should have a general knowledge of each plant operation, industrial relations, including employment methods and problems, transportation, housing, recreation, educational facilities and methods, and employees' benefit plans.
5. He should be qualified to determine by examination of employees their physical and mental fitness for work.

6. He should have a knowledge of the ingredients and of the toxic or disease-producing qualities of all the materials and processes used in the industrial organization which he serves.

7. He should have a knowledge of health education, sanitation, working conditions, accident and occupational disease prevention methods, and preventive health measures in general.

8. He should have a knowledge of the diagnosis and treatment of occupational diseases.

9. He should be competent in the diagnosis and handling of all traumatic lesions which he undertakes to treat.

10. He should be versed in procedure for follow-up and rehabilitation.

11. He should have a knowledge of the workmen's compensation laws.

12. He should have a knowledge of an efficient medical record system and of statistical methods.

13. He should have an unbiased industrial viewpoint and a confidence-inspiring personality.

14. He should realize that his first duty is always to the workman whom he examines or treats.

15. He should like people.

In the opinion of the American College of Surgeons, the effectiveness of an industrial health program is contingent not only upon the qualifications of the physician in charge but also upon the amount of time, energy, and enthusiasm which he devotes to the service. Full-time service by an industrial physician is not always essential to an adequate program. The physician who devotes part time to an in-plant medical department can assume the indicated supervisory responsibilities and render an acceptable medical service by delegating some of the detail work to qualified assistants. The physician who is on call for emergencies or for special work, however, is said to serve in such a disjointed fashion that he tends to lose all interest in the health problems of the industrial establishment he serves. (72)

Dr. William A. Sawyer, after years of experience as medical director of the Eastman Kodak Co., describes the ideal situation as one in which the plant physician and nurse know the plant, its machines, its environment, the character of the jobs, and the men and women who work there. In his opinion every plant physician should be like the one who said to him with pride, "Believe it or not, I've gotten to know this place so well that I think I could do any job here myself." The plant itself is a better place to meet employees than the medical dispensary, for they are more at ease in their regular environment. Periodic visits by both physician and nurse through the plant, stopping here and there among the employees, are an important part of an in-plant health program. Dr. Sawyer states that he knows of nothing more valuable if the medical service program is to grow into a real relationship with the employees. The second most important phase of the program, according to him, is making it evident that the employee is a

most welcome visitor to the medical department, and proving to him that the medical department is a place where his troubles are of paramount importance.

It is difficult to determine how much time the part-time physician should give to an industry to develop an adequate health program. The size of the plant, hazards involved, shifts worked, types of work being done, labor turnover, services provided, age and sex distribution of employed groups, the distance to a hospital, availability of physicians in the community, and other such factors have to be taken into consideration.

Where physicians are to serve on a part-time basis, it is important to determine the amount of time necessary to provide adequate services and to be sure that after the program begins to operate the time schedule is adhered to or even extended where the health needs of the employees require it. In arranging the time schedule, consideration should be given to both the production time schedule which influences the hours the employees can most conveniently be in the health room and to the private office hours of the physician.

Among the programs described in section III, the Astoria Small Plant Health Demonstration Program originally estimated that 3 hours of physician's time per week per 100 employees would be needed to serve the participating plants. As the program developed, two of the seven plants reduced the hours to 2 per 100 employees, but persons closely associated with the program are of the opinion that 3 hours of physician's service per week per 100 employees are necessary for a complete program.

For the plants participating in the Philadelphia Health Council Demonstration Program, the original estimate was 1 hour of physician's service per week per 100 employees, but experience proved that this is not sufficient where an industry has a special health problem.

The physician who serves the eight plants participating in the Hartford Small Plants Medical Program visits each plant at least twice a week, with his hours at each plant varying from three to eight. In terms of the number of employees in each plant, he spends from 48 minutes to 1 hour and 48 minutes per 100 employees per week.

In planning for small plant cooperative programs in Georgia, it was estimated that a program serving 1,000 employees would require the full-time services of a physician. At present, the three industries served by the Petrie Clinic in Atlanta have 750 employees. The part-time physician who provides service spends 2 hours a day 5 days a week in the clinic and makes periodic visits to the plant or the equivalent of 1.3 hours per week per 100 employees. The program descriptions in section III give additional information on the amount of physician's time provided to small plants participating in the various programs.

With only 2,000 physicians in the United States devoting all or a

major part of their time to industrial practice, the general practitioner will have to assume a much larger share of responsibility for in-plant programs if many new programs are to be developed in small plants. Dr. Dwight O'Hara has recently urged the entire medical profession to interest itself in the field of occupational health, stating that in an industrial nation such as ours the field of industrial medicine is too large to be handled by one specialty. The meeting place for industrial health is more than a forum of toxicologists, more than a medical meeting where occupational diseases are discussed; it is an assembly line at which one group after another may add its own particular and specialized touch to the final product, industrial health.

If the general practitioner is to render an adequate service to industry, he will require additional specialized training as well as the active assistance of the experienced industrial physician. Just as the leadership of the obstetricians and pediatricians has raised the level of maternal and child care provided by the general practitioner, so the trained and experienced industrial physician must take the leadership in pointing out to the general practitioner the vast opportunities for preventive services offered by in-plant health programs. If the majority of general practitioners would spend only a few hours a week in a plant, they would be able to provide dynamic leadership in health improvement and better job placement and concurrently give better care to their private patients because of their increased knowledge of the effect of the working environment on health.

Another way in which the general practitioner can be aided has been suggested by Dr. A. G. Kammer, president of the Industrial Medical Association. In his opinion, many more local societies of industrial practitioners should be developed as an aid to physicians who go into industrial practice as a temporary means of augmenting income derived from private practice. Without help these physicians cannot be expected to give the time necessary to learn the field of industrial practice in addition to keeping abreast of developments in their fields of private practice. With help some of them may become interested enough in occupational health to continue to give at least part time to it. According to Dr. E. C. Holmblad, medical director of the Industrial Medical Association, many of the career industrial physicians and surgeons started out with a mixed practice and increased their industrial practice after they realized the splendid opportunities to render service which it offers.

In discussing the relationship between the industrial physician and the general practitioner, Dr. E. P. Luongo states that every industrial physician has certain responsibilities in his relationships with other members of the medical profession. Industrial medical practice is being given rightful recognition and proper status, and it is up to the industrial physician to perpetuate this status. Through his contacts with the physician in private practice, the industrial physician can bring about

a better understanding of industrial medicine, which, if properly practiced, taxes the ingenuity of a physician more than any specialty. The industrial physician must be conversant with the principles of all specialties in medicine. He must display a well rounded knowledge of his own field, including industrial hygiene; if he himself is confused, he cannot expect to promote better understanding of his work among others.

The Subcommittee on Manpower Conservation of the Committee on Industrial Health Defense of the Council on Industrial Health, American Medical Association, recently pointed out how the professional responsibilities of physicians in industrial health activities differ in many respects from the customary practice in hospitals and the general community. It concluded that if health services in small industries are to be covered adequately, provisions must be made for the part-time work by physicians in general practice who will need special training in industrial health activities. Since it is impossible for most physicians to leave their communities for extensive training at medical centers, the subcommittee suggested that provisions be made locally through the State and county medical societies for orientation courses covering a period of 9 to 10 weeks, with two evening sessions of 2 hours' duration each week.

With the participation of experts in the various health fields, this type of training was carried on quite successfully during the Astoria-Long Island City, the Philadelphia, and the Williamsport small plant health demonstration projects. See section III. The series of lectures used in connection with these projects covered such subjects as organization and administration of an industrial medical department; environmental control of occupational diseases; method of plant survey; industrial nurses; industrial dentistry; occupational dermatoses; toxic effects of heavy metals, gases, fumes, and vapors; safety in industrial medicine; industrial health in relation to psychiatry, pathology, and ophthalmology; vocational rehabilitation; absenteeism; and nutrition.

The Subcommittee on Manpower Conservation also pointed out that several medical schools offer an organized course of postgraduate study which is available to physicians who can put aside a period of a year to complete the required work. A list of educational institutions offering courses in industrial hygiene is given in the appendix in exhibit 2. Courses on industrial health are also given at some universities to medical students. The following are the objectives of a 16-hour course for junior medical students at the University of Michigan:

1. To provide sufficient opportunity for the student to recognize the responsibility and value of the general practitioner in promoting and maintaining the health of the working population; and to enable the student to acquire enough knowledge on which to base an intelligent attitude toward industrial health in its broadest preventive medical aspects.

2. To create an awareness in the student that his patient has an occupation, and that this occupation may have an important bearing directly or indirectly on his illness regardless of its origin.

3. To furnish adequate material for the student to understand that a relationship exists between the socio-economic status of his patient, always a factor in any illness, and his occupation; and that his patient's treatment should never be considered complete until his earning capacity is restored.

4. To acquaint the student with the common and important environmental health hazards which exist in industry; along with the pathological changes they may produce, and the medical and engineering methods for their control.

5. To afford an opportunity for the student to evaluate occupational medicine as a possible field in medicine in which he may wish to specialize—either in a part- or full-time capacity.

In summarizing the course, Dr. Clarence D. Selby, its director, stated that he believed firmly in the future and security of industrial medicine in view of the rapid strides now being made by industrial health education and research. He predicted continued progress for industrial medicine only as long as the importance of these two elements is recognized. (43)

Remuneration for services is another important point to be considered in relation to expanding in-plant programs. It should be adequate enough to enable the physician to consider his services in the plant as a permanent part of his medical practice. The physician with adequate training and constructive ideals needs a reasonably stable and predictable framework in which to work. He must be made to feel that the in-plant program in which he is participating is constructive and permanent, not merely a routine service which he provides as a means of supplementing his income from private practice. Information on payments to physicians under cooperative small plant programs is contained in the project descriptions in section III.

Nursing Services

The prime requisites for an industrial nurse are a liking of people, a sound knowledge of the breadth and scope of modern industrial nursing, and the ability to apply this knowledge to her work. She is not practicing good industrial nursing or contributing the most to occupational and community health unless she is thoroughly familiar with plant operations, employee health status, and community resources and is busy with such activities as case finding, health counselling, referrals, health education and follow-up, periodic plant rounds to discover threats to employee health, and participation in plant safety activities.

Industrial nursing has been defined as the application of nursing skill to groups of men and women at their place of work to help them build and maintain their best health, and to render prompt and efficient nursing assistance when they become ill or injured.

Where a full-time plant physician is not available, it is the inherent duty of the industrial nurse to be the connecting link in the chain of professional care, and her success in such an undertaking will prove with certainty the difference between the nurse finger-wrapper and the practitioner of professional industrial nursing. In interviewing employees on their return to work after enforced absences, for example, the nurse may become the prime factor in determining their fitness for work and their need for periodic examinations, referral and follow-up for the correction of remediable defects. The function of the industrial nurse also includes liaison work with the personnel department in facilitating the individual placement of workers, according to their physical and mental fitness for work, rehabilitation and participation in the program for the sick and disabled worker.

The American Association of Industrial Nurses considers the duties and responsibilities of the nurse in industry to be as follows: (1) Give emergency care for all occupational injuries as authorized by written standing orders signed by the physician in charge; (2) give treatment for occupational injuries and illnesses under the supervision of the physician in charge; (3) give emergency care for non-occupational disabilities and see that the patient is referred to his own physician for further treatment if necessary; (4) organize and maintain a clean, smooth-running, and efficient health service unit; (5) keep currently informed about plant processes and materials through frequent plant tours and conferences with department and division heads and others; (6) participate in pre-placement and periodic medical examinations of workers; (7) participate in the plant health and safety educational program; (8) assist with plant sanitation; (9) participate in plant welfare activities; (10) maintain in confidential files, and regularly analyze, employee records and health service reports; (11) keep abreast with developments in science, in industry, and in her profession. A detailed description of the duties and responsibilities is given in exhibit 12 in the appendix.

Hilda Brent, R.N., describes some of her own activities in industrial nursing as follows: "I am able to contact almost each employee every day. How easy it is to see that John Brown doesn't look well and has lost weight. Perhaps a talk with him will send him to his family physician. Or, watching Bill Smith at work, I can see him squint and frown. After I talk with him he decides to go to an oculist. . . . How many times have I heard from a man with a lacerated finger, 'before you came I'd put a chew of tobacco on that,' or the home remedies of bacon fat on boils or bread and milk on eyelids for flash burns. . . . The accident rate dropped from 145 in 1946 (before any

nurse was here) to 41 in 1949. It has been slow, and there is still much to be done."

The industrial nurse, because of her duties and responsibilities, needs special qualifications and experience. Unquestioned integrity is particularly demanded in industrial service as well as an interest in, and an ability to work effectively with, all types of people; good physical health; emotional stability; initiative and good judgment; resourcefulness; ability to organize, especially where nursing supervision is not provided; ability to appreciate the importance of one worker's health to the efficient operation of the industry as a whole. The industrial nurse needs vision to see the values of long-range benefits to workers and to recognize that delayed rewards do not mean failure. "Nurses with eyes that see only the physical surroundings in which one must work and such accomplishments as can be neatly recorded and filed at night are too nearsighted for this field." (102)

Authorities in the field of industrial medicine often have called the industrial nurse the most important person in the in-plant health program. From his experience with small plant programs in Philadelphia, Dr. Glenn S. Everts says that a small plant program will fall by the wayside without the sustained interest of the physician and his adherence to the hours scheduled for his visits at the plant. He points out, however, that the plant nurse is the key to the permanent success of the service even more than the physician, especially if the physician is in private practice.

The national professional organization of the industrial nurses, formed in 1942, the American Association of Industrial Nurses, Inc., is an outgrowth of local and regional organizations, the first of which was established in 1915. The primary functions of the organization are to establish sound standards of education, practice and policies in industrial nursing; to establish rapport with industrial management, medicine, safety and allied groups, and to promote mutual understanding within these groups; to interpret the objectives and ideals of industrial nurses to the professional and lay world outside their special field; to bring industrial nursing participation into the plans for advancing industrial and community health.

According to Mrs. Gladys Dundore, executive secretary of the American Association of Industrial Nurses, Inc., one of the main professional problems in providing industrial health services today revolves around the nurse in the small industry where there is no medical direction at all or where the on-call physician is rightfully unwilling to assume medical responsibility for the over-all plant health service. Standing orders, states Mrs. Dundore, are by no means a solution to the question of medical direction and adequate protection of patients. They are not, and cannot be, a substitute for medical direction. They are a set of general rules rather than a specific order regarding a specific patient with a specific diagnosis; their use requires the nurse to make a

"tentative diagnosis" before applying treatment; they are of no value unless signed by a physician; and they cannot include directions for care of all possible injuries and illness.

Dr. W. E. Park, director of the Division of Industrial Health, Minnesota Department of Health, recently made a convincing plea for giving the fully-trained registered graduate nurse an opportunity to use her highly specialized training to the fullest by making medical supervision available to her in industry. It is essential that the industrial nurse have a physician to guide her medical and surgical activities, because no one else is qualified to give this guidance. As Dr. Park states, no employer, unless he is a physician would dare take the responsibility of telling the nurse what she should do for a patient.

Since so many of the nurses working in small plants have little or no nursing supervision, or medical consultation, the American Association of Industrial Nurses has given particular study to the qualifications, knowledge, and skills that such nurses should possess. They recommend that she have a minimum of five years' experience in nursing as a registered graduate nurse of which at least one year has been under direct nursing supervision, preferably in an industrial medical department, an emergency clinic connected with an accredited hospital, or a community health agency, such as a health department or a visiting nurse association. Because detailed suggestions on this point will be particularly helpful in selecting a nurse to work in a small plant, the material developed by the association is reproduced as exhibit 13. Exhibit 14 provides a yardstick for measuring industrial nursing services in the plant.

Industrial nurses have recognized a need for additional knowledge beyond that gained through regular nursing courses. Probably the first special course designed for them was offered in 1917 in the College of Business Administration of Boston University. Exhibit 2 in the appendix lists educational opportunities in occupational health now available for physicians, dentists and nurses.

Special courses were provided for nurses interested in industrial work by the Astoria-Long Island City, the Philadelphia, and the Williamsport small-plant projects. One or two evening lectures a week for a period of from 6 to 10 weeks were given, covering such items as: history of industrial nursing; qualifications, duties and responsibilities of an industrial nurse; pre-employment, placement, periodic and special examinations; occupational accidents and hazards, and non-occupational illness; compensation—method of reporting compensable accidents and illness; what industry expects from its medical program; the official health agency's interest in industrial health programs; function of bureau of industrial hygiene of State department of health; mass chest X-ray in industry; sight conservation; accident and safety program; sanitation, ventilation, lighting, noise and dust; the use of health

education materials; problems of women in industry; dental program in industry; and occupational dermatitis.

How much nursing time is required for an adequate in-plant program? Several reports include estimates of nursing needs, but many variables influence it. It has been recommended that there be one nurse in plants with less than 300 employees; two or more in plants having 600 employees, and three or more in plants having 1,000 employees. One additional nurse was recommended for each additional 1,000 employees up to 5,000; and when the plant exceeded this size, one additional nurse for each additional 2,000 employees was recommended. It was stated that industries employing less than 500 workers which do not have serious occupational hazards may find part-time nursing services adequate. (10)

The recommendations for the development of cooperative small plant programs in Georgia anticipate one full-time registered nurse for each 300 employees in a unit having up to 1,000 employees. At present one full-time nurse is serving about 750 employees of the small plants cooperating in the Petrie Clinic, or the equivalent of about an hour per day per 100 employees. In the Hartford program, where the size of the establishments varied from 225 to 600 employees, one or more full-time nurses was employed by each. The number of nurses depended both on the number of shifts in the plant and the hazards of the industry.

According to the recommendations of the Committee on Part-time Nursing of the National Organization for Public Health Nursing, the minimum block of part-time nursing should be 2 hours per week for any plant of more than about 35 workers. The committee recommended that the nurse should be in the plant when the physician is there, and it stated that a ratio of 3 hours of doctor's time to 9 hours of nursing time for each 100 workers is desirable and necessary when comprehensive pre-placement and periodic physical examinations are done. It pointed out also that the time will depend upon such factors as the plant needs, the interest of management, and the extensiveness of the services to be provided. (116) In the New Haven demonstration project, where visiting nurse service was used, three plants with a combined employment of about 550 used the half-time services of a nurse, or the equivalent of 4 hours of nursing time per week per 100 employees. It should be added that in this program the nurses visited each plant each day.

Recently, staff members of the Division of Occupational Health made a time study of nursing services in small manufacturing plants. One of the major recommendations of the study is that the plant physician, nurse, and management, together with available consultants, review periodically their health service programs to determine how effectively health service needs are being met; and to determine what activities are being performed by nurses which could be done more economically by other personnel. This type of review is essential in all health service

programs if the services of available nurses are to be spread most equitably between the community and industry. (15)

The visiting nurse associations have made a distinct contribution to the development of in-plant services in small plants through the provision of part-time nursing. Probably the Visiting Nurse Association of Chicago was the first public health nursing association to undertake industrial work. Its annual report for the year 1903 announced that the McCormick Peanut Company employed a nurse who was on duty half time in the plant and half time in the homes of the employees. As time went on, other firms contracted for the service, and as many as 11 nurses were on duty at the Peoples Gas, Light and Coke Company, the Federal Reserve Bank, and three plants of the International Harvester Company. These nurses were gradually released from the association to work full time in industry as the need for more nursing services was realized by management. At present the association serves many plants on a home-visit basis, but gives no care in the plants.

The provision of in-plant nursing service by the visiting nurse associations at the present time is more extensive than may be realized. The National Organization of Public Health Nursing in its 1950 annual review of 289 selected nonofficial public health agencies found that 33 such agencies in 13 States were providing nursing service in 69 small plants. Two organizations did not report the number of employees in the 8 plants they serve, but the 17,000 employees employed in the 61 plants for which information is available received a total of 475 hours of nursing service per week.

The hazards of the industries and the number of shifts, as well as other factors that influence the amount of nursing services needed, are not known. However, the material presented in table 3 is a summary of the existing situation in the provision of part-time nursing service through nonofficial agencies.

Seventy percent of the plants having part-time nursing service employed between 150 and 400 workers. Most of these plants received from 1 to 4 hours of service per week per 100 employees. None of the firms with 400 or more employees received as much as 3 hours of nursing service per 100 employees. Very few firms, regardless of size, received 6 or more hours of service per 100 employees.

In general, when nursing services are provided by visiting nurse associations, the content of the plant medical program includes pre-employment and periodic physical examinations, special examinations for employees returning after an absence of one week or longer due to illness, referrals to private physicians for treatments of defects found, health counselling, and referral to community health and welfare resources.

It is the policy of the visiting nurse associations to provide care in industry only when a physician visits the plant on a regular time schedule, the minimum usually being once a week.

One of the special assets of a public health nurse is her familiarity with the community. The director of one of the visiting nurse associations stated that from the moment the public health nurse enters a visiting nurse organization she thinks in terms of community resources for assisting in the solution of health and social problems. Therefore, she is in a position to be of practical assistance in arranging for such services as medical or nursing attention at home, convalescent care, hospital care, mental hygiene and rehabilitation services, temporary child placement, or recreational activities. She pointed out that all plants served by the association have close working relationships with a neighborhood hospital for emergency treatment, and with other health and social agencies.

Table 3.—Distribution of 61 plants receiving part-time nursing service from nonofficial agencies according to size and average number of hours of nursing service per week per 100 employees¹

Size group of plants (number of employees)	All plants	Average number of hours of nursing service per week per 100 employees									
		Less than 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	9 to 10	13 to 15	20
Number of plants											
Total.....	61	7	14	15	9	4	3	4	1	3	1
Less than 100.....	4							2		2	
100-149.....	4			1		1	1				1
150-199.....	8	1		3	1	2		1			
200-249.....	12		4	6	1			1			
250-299.....	6	1			3	1			1		
300-349.....	9	1	3	1	3					1	
350-399.....	8	1	3	1	1		2				
400-499.....	1		1								
500-599.....	4	1	1	2							
600-699.....	2	1		1							
700-800.....	3	1	2								

¹ Based on a 1950 survey of 289 selected nonofficial public health agencies by the National Organization of Public Health Nursing.

Source: National Organization of Public Health Nursing. New York, 1951. Unpublished data.

One authority in the field has stated that the strength of the service is largely dependent upon a nursing supervisor who knows industry and can help the staff nurse relate her public health experience and knowledge to the industrial situation in such a manner that her activities are effective in the solution of occupational health problems.

Miss Hubbard, the director of the Visiting Nurse Society of Philadelphia, believes that the employer wants a regular reliable, skilled nurse who is a staff member of the plant when on duty, and the assurance of continuity of service by an equally skilled alternate. The nurse must have the maturity, professional skill, and personality that enable her to establish a friendly working relationship with the plant personnel and to act with good judgment in emergencies, on the basis of standing orders from the plant physician.

In developing part-time nursing in small plants visiting nurse associ-

ations not only are meeting a real need for the present, but also are helping to find practical answers for the future. They are demonstrating the value of health services to small plants. A proof of the high quality of their work is evident in the large number of small plants that decide to employ a full-time industrial nurse after having had part-time service through the visiting nurse association. A list of associations now providing this part-time service to industry appears in exhibit 15. Further information concerning other associations may be obtained from the National Organization for Public Health Nursing, 2 Park Avenue, New York, N. Y.

Dental Services

Few plants provide dental services. Small plants encounter special problems when planning for this type of care, but several methods have been considered. For example, several plants may employ a dentist full time to provide services on a part-time basis at each plant or in a central clinic to which the employees of all participating plants are referred. A plant may obtain services on an individual basis by employing a dentist to serve part time either at the plant or in his own office. Another method is an arrangement whereby dentists in private practice supply diagnostic services to employees in one or more plants, with the employee being referred to his own dentist for treatment. For a number of small plants, scattered over a wide area, consideration could be given to the possibility of using a mobile dental office or other portable equipment through which dental services can be taken to the workers at their place of employment.

Content of an Industrial Dental Program

The value of employee dental programs was recognized at the 1950 meeting of the Council on Dental Health of the American Dental Association, where a resolution was passed encouraging the American Association of Industrial Dentists, the group primarily concerned with dental programs in industry, to do everything possible to encourage the establishment of programs providing the following services: pre-placement and periodic dental examinations; emergency dental palliative service; keeping of accurate dental records; education in dental health; and referral of patient to private practitioner for treatment of disease of non-occupational nature.

The Committee on Dental Economics of the American Dental Association also has stated that industrial establishment should insure effective care of all employees who need palliative emergency dental treatment because of occupational injuries or who have developed oral manifestations of occupational diseases. They also recommend that employees be educated in the value of oral health and urged to obtain necessary dental treatment. The essentials of an industrial dental

service developed by the Committee on Dental Economics are listed in the appendix in exhibit 10.

The well-trained industrial dentist becomes familiar with the plant operations and job activities so that through his knowledge of materials and hazards he can quickly recognize the oral evidence of occupational disease. He works as a member of the medical team. His dental records supplement medical findings and provide data for the evaluation of the total plant health program. Whenever oral evidence of occupational disease is noted, the medical, dental, and safety personnel should make a joint investigation and plan action to remedy the situation. As pointed out by Dr. James A. Dunning, according to our present knowledge, only about 5 percent of the workers' dental needs are of occupational origin. The industrial dentist, who devotes a major part of his time to providing preventive dental care and to oral health education, is therefore actively practicing public health dentistry.

The State health departments can give assistance in developing in-plant dental services. Although Pennsylvania is the only State with an industrial dental division, the dentists on the staff of at least 46 other health departments are available for consultation.

The industrial nurse also can make a significant contribution to dental health, according to Frances C. Hickey, industrial nursing consultant for the Bureau of Industrial Hygiene, Pennsylvania State Department of Health. Even though she may be working in a plant that is without a dental service or perhaps without a medical service, she can still promote oral health by educating the employees, and indirectly their families, concerning the value of oral health, periodic care, and early treatment of dental disease.

Surveys of Extent of In-plant Programs

A study of 333 firms made in 1948 by the National Industrial Conference Board indicated that practically no dental service existed in plants with less than 1,000 employees and that little existed in the larger firms. Sixty-one firms with less than 500 employees were included in the study, and only one provided dental service. None of the 57 plants with from 500 to 1,000 employees had a full-time dentist, and only four had part-time dentists. Among the 215 plants having 1,000 or more employees, the following dental personnel were employed: 4 full-time dentists, 12 part-time dentists, 20 on-call dentists, 6 full-time dental hygienists, and 1 part-time dental hygienist. In the same year, in a study of 278 firms made by the Industrial Hygiene Foundation, only 47 were found to have any type of dental service; 42 of these plants employed 1,000 or more workers. (149, 161)

Examples of Employee Dental Programs

The dental experience of several industries with 1,000 or more employees is summarized for the benefit of small plants planning to establish cooperative clinics. The *Evening Star*, a newspaper in Wash-

ington, D. C., with about 1,200 employees, has had a dental clinic for more than 30 years. Originally, only diagnostic X-ray services were offered with referral for treatment. After about 2 years, the activities of the clinic were expanded. The employees are offered diagnosis, X-ray and prophylactic work without charge, but they pay a reduced fee for other services. The employees' dependents pay a reduced fee for all services.

During 1951, about 65 percent of the 1,200 permanent employees eligible for service used it, and 294 or 57 percent of their dependents, who were registered as desiring to be included in the dental program, also had service. In addition, 28 percent of the 47 permanent employees of the newspaper's radio station, who had indicated a desire to be included in the program, received service, together with 9 of their 36 registered dependents. The cost of operating the dental clinic, exclusive of overhead but including services for wives and children, amounted to \$16,000 in 1951, or an average of \$13.45 per employee. Payments for service amounted to \$7,300, leaving a net expense to the company of \$8,700. The *Evening Star* also maintains a medical clinic which handles pre-employment physical examinations and minor ills and injuries. These services are available only to employees and are financed by the company; the cost in 1951 was \$10.85 per employee.

The American Cast Iron Pipe Co. of Birmingham, Ala., for many years has financed a complete medical and dental program. All types of dental services are provided, but gold and the materials used in making dentures are paid for by the patient. In a few instances, dental care is recommended by the physician, but generally the service provided results from the direct request of the workers or their dependents. The services are available to all. However, the dental facilities are used more extensively by the white families, but in each group the amount of care received varies from year to year. Between 1941 and 1944, the average annual number of services requested by each 1,000 white persons varied as follows: prophylaxis, 103-217; fillings, 343-626; extractions, 178-245; dentures, 52-114; and bridgework, 7-43. Among the other races the rates were: prophylaxis, 23-82; fillings, 52-196; extractions, 83-165; dentures, 2-31; and bridgework, 2-38. (89)

Dental services are found more frequently in those firms having a prepayment plan under which medical services are provided at the plant. In 1945, for example, about 1.5 million industrial workers were eligible to receive various types of medical services on a prepayment basis. Of this group, many also were entitled to dental services either as part of their prepayment arrangements or through the payment of a reduced fee. In 1945, 126 dentists provided services under these programs, 66 on a full-time and 60 on a part-time basis; in addition, an unknown number of local dentists in private practice gave care. In 1943, the number had been higher, 73 on a full-time and 69 on a part-time basis, but dur-

ing the war the programs experienced difficulties in maintaining adequate staffs. (90)

The following indicates the percentage of the 1.5 million industrial workers belonging to prepaid medical care plans in 1945 who were eligible for each type of dental service on a prepayment or reduced fee basis:

Service	Prepayment	Reduced fee
Diagnostic X-ray	33.8	11.5
Prophylaxis	9.7	9.9
Extractions	20.4	11.3
Fillings	9.1	9.9

The Labor Health Institute of St. Louis, Missouri, a group medical practice plan developed in 1945 to provide care on a prepaid basis to the members of one small local union, had a membership of over 13,000 on January 1, 1951. Under collective bargaining agreements, the companies financed the plan by paying an amount equal to 5 percent of wages if family care is to be provided and 3½ percent if only the worker is eligible for care.

Dentistry is an integral part of group medical practice at the Labor Health Institute. The personnel of the dental and medical sections have frequent consultations on individual patients, and information on dental examinations and service is a part of each patient's medical record.

Dental services include examinations, extractions, fillings, prophylaxes, dental X-rays, dentures, fixed bridges, periodontal treatment, and dental hygiene. Up to 1951, patients paid 50 cents for each filling, but all members now receive dental diagnosis and treatment free of charge. However, materials and any needed drugs are charged for on a cost basis; for example, \$25 for a fixed bridge and \$40 for a full denture.

During 1950, the 9,000 persons eligible for care made an average of 1.4 dental visits per person. A total of 36,850 dental services were provided in that year. The following services, among others, were received by each 1,000 persons eligible for care: Full mouth X-rays, 166; prophylaxis, 95; fillings, 404; extractions, 369; scaling, 94; gum treatments, 108; and tooth treatments, 127.

Examples of other prepayment programs that provide dental services are those of the Consolidated Edison Co. and Macy's Department Store, New York; Stix, Baer & Fuller Co., St. Louis; and the Group Health Association, Washington, D. C.

The Advantages of Employee Dental Programs

The advantages of having at least preventive dental service performed at the plant are indicated by several recent studies dealing with the supply of dental personnel in the present defense period. The situation now is similar to that during World War II, when it was found that the

dentists' hours per week increased from 46.9 hours to 50 hours, and the hours at the chair increased from an average of 34.3 to 37.7 hours per week. If the same demand for dental services as is generally found in periods of prosperity continue, it will be increasingly important to consider the advantages of providing dental examinations at the plant where the time of the dentist, as well as the worker, can be conserved. The extent to which such services are needed and used by employees is indicated by several studies of dental programs for employed groups. (33)

A study made at the health department of Merck & Company indicated that the teeth of the executive group of workers were in good repair or were receiving the necessary dental attention at the time of the examination. Among the group of workmen examined, however, the number of obvious carious teeth and the number of missing teeth were much greater, and the number of filled teeth was distinctly less than among the executives. The findings of the study suggested that the attack rates were about the same in both groups but that proper attention had not been given by the workmen to their carious teeth. Of the group of 70 workers in the study, 30 had the necessary work done promptly and 12 more were induced to receive treatment after a few recalls to the dental department, but 28 of the original 70 could not be persuaded to visit a dentist. (54)

A study in 19 Pennsylvania industries, made by the dental consultant of the Bureau of Industrial Hygiene of the Pennsylvania State Department of Health, revealed that of the 3,000 workers employed, about 2,200 needed some type of dental service. Almost 3,400 recommendations were made to this group, and about one-half were carried out within the following 6 months. (12)

The value of the dental examination given at the International Ladies' Garment Workers' Union Health Clinic at Wilkes-Barre, Pa., is indicated by the fact that approximately 90 percent of the patients who were advised to visit their dentists were found to have done so when reexaminations were made. That such a high percentage of patients took the advice of the dental staff is attributed not only to the educational program of the dental department, but also to the medical staff who constantly explain the importance of good oral health in relation to general health. (18)

Facilities and Equipment

Ideally, an industrial health facility should be the result of joint planning by management, the physician, the nurse, and an architect experienced in the construction of hospitals and health centers. The test of satisfactory physical facilities for a plant health service is the degree to which the facilities meet the specific needs of the plant.

Good industrial medicine can be practiced in any location in the

plant that can be kept clean and provide privacy but medical authorities generally recommend as desirable a waiting room, a treatment room, an examining or consultation office, and a rest room. This arrangement permits adequate space for handling ill and injured workers, expedites the work of the medical staff, provides greater privacy, and prevents uninjured persons from observing the treatment of accidents. The waiting room need not be very large if the health examinations and return visits are distributed throughout the day so as to prevent congestion and unnecessary loss of time. Arrangements should be made so that applicants for employment waiting for physical examinations do not mingle with injured workmen.

The adequate, compact, well-equipped, uncluttered unit of rooms, with advantageously placed entrances and exits, will facilitate effective service, and the right arrangement will conserve the time of both professional personnel and the workers. Experience indicates that a medical unit will command respect only if careful attention is paid to suitable and efficient housekeeping, appearance, and equipment. Persons experienced in the provision of health services, especially in small plants, have listed the following features that have proved to be so desirable that they may be considered minimum essentials for industrial health units:

1. The basic industrial health unit consists of a minimum of three rooms—a treatment room, a rest room, and a toilet. In addition, a waiting room and a consultation room are highly desirable.
2. Preferably, the health service should be situated on the first floor, with an exit that can be reached easily by automobile entrance. Considerable distraction to other employees occurs when a patient is assisted through the workroom, and the patient may experience unnecessary discomfort if he has to be taken by a circuitous route to a conveyance. If there is no space available on the first floor, accessibility to an elevator is essential.
3. It is desirable that the health services be adjacent to employment and personnel departments. Coordination of service is promoted when these departments are housed as a unit.
4. The health service should be accessible to workers. In the small, compact plant, one unit can fill this requirement; in the large plant, decentralization with small first-aid stations in strategic locations is preferred.
5. In hazardous occupations, the health service should be situated in a safe zone.
6. The rooms should have excellent light and controlled temperature and ventilation.
7. Freedom from noise and vibration is important. It is highly desirable that the rooms be soundproofed if situated near noisy processes.
8. Expansion must be allowed for, if possible. Frequently, the

service which starts with a first-aid station expands to become a health service with a full-time medical director. As the medical department proves its worth, space for additional personnel and equipment for additional services, such as X-ray or physiotherapy, may be added to the original unit. (69)

Four examples of floor plans are given in exhibit 16. The first two are first-aid rooms requiring about 95 and 135 square feet of floor space, respectively. The third is a floor plan for a dispensary in a small plant. It requires about 350 square feet and is designed to serve a plant having less than 500 employees. The fourth, which is designed for a medium-sized plant, requires about 1,000 square feet.

A list of recommended equipment for a small plant dispensary prepared by the Council on Industrial Health of the American Medical Association is given in exhibit 17. The council recommends that, wherever possible, the physician should select his own equipment and supplies, which should be of good quality to withstand hard usage. The list of equipment and supplies developed by Dr. Millman for the medical departments of the small plants participating in the Astoria-Long Island City program appears in exhibit 18.

Record Keeping and Research

Adequate records are essential to any well-rounded health program. They must be simple in order to take a minimum amount of the nurse's time, but they must be in sufficient detail to meet the legal requirements of the State and to provide management with data on those parts of the program in which it has the greatest interest and concern. In addition, they must provide data necessary for individual health counselling, program planning, and interpreting to management the health status of the employees and the areas where improvements are needed. All health records should be confidential to the medical department but data which are necessary for proper placement may be interpreted by code to the persons responsible for placing the worker.

It is generally recommended that for each employee a folder be maintained which will include his work history, reports on his pre-placement and periodic health examinations, recommendations regarding the correction of any physical defects, and any written orders received from the family physician for treatments to be given at the plant.

The nurse should also maintain an individual health record card for each employee. These cards are an essential tool for any health program which has health maintenance as one of its objectives. They are flagged to indicate any special health problem of the employee and are used in case finding, proper referral and follow-up services. An example of an individual health record is given in the appendix in exhibit 21. It is a simple chronological listing of the complaint, the service and

advice that was given, the date of service, the initials of the physician or nurse giving the service, and the days lost from work.

The daily service record, the second essential record, provides data for a numerical monthly report of services provided; it may or may not include the names of the employees. It also is the basis of a monthly narrative report to management highlighting unusual happenings during the month, describing accomplishments and suggesting methods for improvements in the health program. The daily service records are of two general types. Exhibit 19 shows the type that is designed for use where pressure of work makes it impractical for the nurse to record immediately, on the individual health record, the service given to a worker. This type of record, therefore, contains the name of each employee seen. It is assumed that the material will be transferred later to the worker's health record, but the disadvantages of this procedure are that the physician or nurse does not have the employee's health record for quick review when care is being given. Also, errors may be made in transferring the material, the nurse may never find it convenient to transfer it, or when she does she may recall only a portion of the complaint and the services given.

Both types of daily service record should include a count of service provided for occupational and non-occupational conditions and should distinguish between them. In many instances this will be easy for the nurse, but in a few the classification may be difficult. The nurse's responsibility at all times is to record concise and accurate statements of fact for any injury or illness, making the report as impartial and objective as possible.

If the practice is established of having each employee who is absent because of illness report to the nurse when he returns to work, it will be a relatively simple matter for her also to make a monthly report on numbers of absences, time lost because of illness, and the cause of illness by department. It is through a review of such reports that clues to conditions causing absenteeism can be found.

On the other type of daily service record, it is only necessary to enter a tally under the proper department and under the proper disposition item to account for each visit to the dispensary. This form provides no listing by name of the persons receiving service each day and it is assumed that the complaint and the services given to each individual are entered in his health record immediately. The disadvantage of this type of daily service record is that the nurse, when busy, may forget to enter the check mark on the tally sheet. It has the advantage, however, that at the end of the day the material is already summarized. Exhibit 20 is an example of this type of form. The same form may be used for a daily and a monthly record. When used for a daily record a tally mark is entered in the appropriate space as each service is provided. When the monthly record is prepared, numbers are entered to show the total number of visits made by employees from

each department for specified illnesses and injuries and the dispositions made. Regardless of which daily service record is used, a detailed monthly service record similar to that given in exhibit 20 has been found useful.

Special reference should be made to the sections on the daily service records dealing with referrals and conferences. These are important activities which the nurses often neglect to include in their daily service records and hence management has no way of knowing the volume of activities in this area. Consultation which is given to an employee who visits the health room for some other reason should not be counted as a conference but should be recorded according to the reason for the visit. Only visits which employees make especially to confer with the physician or nurse should be recorded as conferences. (187)

Forms, "Referral of injured or ill worker to physician by plant nurse," and "Physician's report to nurse" are given in exhibit 22. It is particularly important for the nurse without full-time medical supervision to use forms such as these. It will be noted that on the physician's report to the nurse he indicates whether further medical attention is needed, the date and time the employee should return to the physician's office, and the medication or other care to be given at the plant.

All forms that have been reproduced are given only as examples. They will need to be modified to meet the needs of each plant, but they include the items that have been most commonly found to be needed. Advice on the development of a simple record and reporting plan may be obtained from the industrial nursing consultant of the official industrial hygiene agency or the generalized nursing consultant in the State health department. If a plant carries insurance with a company having a nursing consultant, she is another source of advice.

The nurse should remember that management itself is a source of technical assistance in the preparation of statistical summary reports. The reports of the medical department that will prove most useful to management are those which have been planned jointly by an official of the company and the medical department and therefore take into account the needs of management.

In the final analysis the completeness and accuracy of reports will be dependent upon the training and experience of the nurse and the degree to which both she and the physician understand the value of records and their usefulness in the evaluation and development of the program.

Dr. Arthur Hoag, medical director, and Dr. Max Howard, physician in charge of East River operations, of the Socony-Vacuum Oil Co., recently emphasized that industrial medical departments provide an excellent opportunity for many types of research which could be of great value not only to the employee and his employer, but also to industry in general and to the medical profession. This company, in its 16 or more plants with well-developed medical departments, studies

general medical problems as well as problems peculiar to a specific occupation, utilizing the unusual opportunity for long-term research that a medical department of an industry enjoys. Whereas the private patient may move from doctor to doctor or clinic to clinic, the employee usually remains with the job, enabling the medical department to maintain a continuous follow-up study not only of individual employees but also of groups of employees engaged in similar work.

A 1948 study of 278 establishments indicates the lack of adequate health records in small plants. Of the 43 establishments with less than 500 employees included in the study, only 16 percent maintained individual health records under medical control. Less than 19 percent of the 49 establishments with 500 to 999 employees maintained such records. The chances of finding adequate records were greater in the larger establishments. About 40 percent of the plants having from 4,000 to 9,999 employees and over 88 percent of the plants with 10,000 or more employees had individual health records under medical control. (149)

Costs and Values of In-plant Programs

Costs

The cost of an in-plant health program will be influenced by such factors as the type of service provided, the cost of equipment and supplies, the method of providing professional services and the prevailing rates for such services, and the number of employees served.

A properly planned program will take into consideration the basic health needs of the plant. For example, a plant that manufactures precision instruments may find that vision tests are of especial value in increasing employee efficiency and will include this service among the benefits provided. In plants where workers are exposed to certain types of toxic substances, special protective health measures must be included among the health services provided. The number of such services provided will influence the cost of the program.

In industries where there is a centralized purchasing system, and supplies and equipment can be bought wholesale and distributed to plant dispensaries, the cost will be lower than where the prevailing market price is paid. By this means, large industries operating a number of dispensaries can save a considerable sum. Groups of plants may also be able to take advantage of wholesale purchasing.

The method of providing physician and nursing service, as well as the prevailing rates for such service in the area in which the plant is located, will affect the cost of a program. Where the physician is paid a fixed rate for his services, the cost is more predictable than where reimbursement is made on a fee-for-service basis. Rates vary from place to place, from physician to physician, and even for the same physician from plant to plant. The prestige and experience of the physician and the belief of management in the value of his recommendations will influence the cost of a program. Many successful industrial physicians report that management is aware of the efficacy of the medical department and has never turned down a request for expansion of the program, new equipment, or more space. Available information on the rates paid physicians by the cooperative programs is given in section III.

The cost of nursing service may also vary according to the method of providing such service, whether through the services of a visiting nurse agency or through direct employment of a part- or full-time nurse. Information on nursing payments made by the cooperative programs is also included in section III.

The number of employees served will seriously influence the cost of a program, the per capita cost of a program showing a decided tendency to decrease as the size of the group increases.

There are several methods of prorating the cost of a program. Probably the most common method is the per capita cost per year, but costs are also figured on the basis of percentage of payroll and on the per capita cost per 1,000 man-hours worked. In the opinion of the late Dr. C. O. Sappington, cost in terms of percentage of payroll is probably the most easily applied unit rating method and the one which may be more understandable and comparable for the use of statisticians or executives; others have recommended the rate per man-hours worked.

The initial outlay is one of the important items to plants considering the establishment of a medical department. The cost of installing and equipping a medical department varies considerably, even among plants of approximately the same size. In a 1948 survey of industrial establishments, Dr. Sappington found that among 12 small establishments, each with less than 500 employees, the original investment ranged from \$450 to \$51,800. The plant making the largest investment had 349 employees but was a mining company located in a very small community of under 500 persons, and for this reason the company built its own hospital and clinic. See appendix table 26.

Among the seven plants participating in the Astoria-Long Island City demonstration program, the cost of installing and equipping medical departments ranged from \$550 to \$3,667; the number of employees served did not in this instance affect either the size or the cost of the department. See appendix table 28.

One of the greatest difficulties encountered in the business administration of a health service department in industry has been the inadequacy of the cost accounting system. Many plants find it difficult to uncover all the expenditures which directly or indirectly result from the operation of the medical department. Charges which should be made against the medical department are often included in the expenses of other departments. The principal reason for this has been the lack of agreement as to what constitutes medical and health expense. The numerous requests for information regarding the items that should be charged to the health program prompted Dr. Sappington to include a procedure for establishing and recording costs of health services in small plants in his publication *Industrial Health Department Functions and Relationships*. The recommended procedure is reproduced in exhibit 23.

In a recent survey by the American College of Surgeons, the average per capita cost for the 442 plants reporting cost data for 1949 was \$14.53; the average for manufacturing plants, \$14.78; and for the non-manufacturing group it was \$13.31. For the 40 plants with less than 500 employees the average per capita cost was \$26.43. This was \$10

higher than the per capita cost reported for any other size group, except the very large plants where the average was \$21.51. In contrast to the higher cost of services in the less than 500 group, 78 plants with from 500 to 1,000 employees paid only from \$1 to \$3 more than plants ranging in size from 1,000 to 8,000 employees. The smallest per capita cost was reported by the group of plants having from 7,500 to 15,000 employees, the average for this group being only \$9.48. See appendix table 25.

In a 1950 survey of member companies made by the National Association of Manufacturers, the 1,576 companies reporting combined costs of health, medical and safety programs had an average per capita cost of \$25.90. The average per capita costs ranged from \$45.39 in plants with 250 or fewer employees to \$15.67 in plants having over 5,000 employees. See appendix table 24.

In connection with their numerous activities in the field of cooperative health services, Dr. L. M. Petrie, director of the Division of Industrial Hygiene, Georgia Department of Public Health, and J. W. Lemon, chief engineer of the Fulton County Health Department, prepared an estimate of the annual cost of cooperative health centers planned to serve groups of employees. According to these figures, per capita costs range from \$14.40 for groups with 1,000 employees to \$8.78 for groups with 5,000 employees. See appendix table 27.

The high cost of providing in-plant health services in small plants has discouraged many firms that are interested in such programs from attempting to install them. The health programs described in section III have, in most instances, overcome this major obstacle by combining to form larger groups. What one small industry cannot attempt alone, several industries have been able to achieve. These programs demonstrate that not only can services be provided to small plants at reasonable cost, but that they are a type of service that has found favor with management, labor, and the medical profession.

Values

The principal value of an in-plant program is the indirect benefits which result from the services provided and these cannot be easily measured. The secondary benefits, which are the savings that can be effected by a program, are also difficult to determine. It is known, for instance, that many factors in addition to a health program may influence such items as reduction in workmen's compensation rates, sick absenteeism, and labor turnover, increase in production, and improvement in employee morale. However, many attempts have been made to ascertain the values of health programs, and some of the results are recorded here as a guide to those who are interested in establishing and evaluating health programs.

On the basis of figures compiled from State and national averages,

Dr. Crit Pharris, assistant medical director, United Aircraft Corporation, estimated in 1950 that the average plant of 150 employees will lose \$22,000 per year through non-industrial and \$8,700 through industrial injuries and illnesses. As the result of a health and safety program costing \$3,000, he estimates that a plant of this size will save over \$7,000 a year. (132)

Both direct and indirect benefits are reported for the East River plant of the Socony-Vacuum Oil Co. As the following table shows, the decrease in working days lost and in the amount paid out in sickness benefits is striking, particularly in view of the fact that wages upon which sickness benefits are based increased 50 percent during the period 1945-49. The medical department, which was started in March 1946, serves approximately 1,500 employees.

Year	Sickness and accident payments	Man-work days lost from non-occupational illness		
		Total	Acute	Chronic
1945.....	\$77,423			
1946.....	115,726			
1947.....	103,802	10,466	6,089	4,377
1948.....	97,570	8,397	4,286	4,111
1949.....	66,565	5,435	3,111	2,324

Medical personnel at the plant believe that the number of working days lost because of illness is a far more accurate measure of severity and control of sickness, since the many variables of the payroll are excluded. They also feel that the interdependence of management, the medical department, and the personnel department cannot be too strongly emphasized. Working together, they can offer a program of constructive medicine from which all will derive benefit, with individual employees obtaining improved health, greater happiness and longer usefulness, so that they will continue to contribute to, rather than to drain, the resources of our country. (77)

The value of a well-functioning medical and personnel program is demonstrated by the experience of the Allen Manufacturing Company, one of the participants in the Hartford small plant program. At this company, workmen's compensation premiums were reduced by 24 percent between 1946, the year the company joined the Hartford Medical Service, and 1950, despite increased costs due to changes in the Workmen's Compensation Act. During both 1950 and 1951, the company's labor turnover rate was 0.7 percent, which represented an 87 percent decrease since 1943. A description of the company's medical program may be found on pages 96 through 103. A tabulation giving additional values of the program during a 9-year period appears in the appendix in table 30.

There are numerous instances where other small plants report specific benefits which they attribute wholly or in large measure to their medi-

cal departments. In addition to the following examples of such benefits, information of this type may also be found in the cooperative and individual program descriptions in section III.

Reductions in compensation insurance: One plant with 160 employees states that during the first year its medical program was in operation, compensation losses were reduced \$4,500 when compared with the losses for the previous year; expenditures for the medical department amounted to only \$1,200. A second plant with 220 employees reports that compensation losses were reduced by \$3,300 during the first year, with an expenditure of \$2,500 on the medical program. In a third plant, where two hours of nursing service were provided at a cost of \$1,000 a year, the compensation loss during the first year was reduced \$4,700.

At least one insurance company has adopted a premium rate which allows discounts to employers who provide in-plant medical services. The company gives a 5 percent discount where pre-placement physical examinations have been in effect two years; a 10 percent discount where the employer maintains a dispensary staffed by a physician or a full-time graduate nurse, where care is provided for non-occupational illness or injury; and a 5 percent discount where the employer maintains a visiting nurse service which provides treatment for non-occupational disability. (101)

Reduction in absenteeism: An examination of 500 employees in one plant revealed 287 defects. After corrective measures were applied, the decrease in lost-time alone almost covered the cost of the physical examinations the plant provided. In another plant with 115 employees, where the cost of installing a medical dispensary amounted to \$600 and the operating cost to \$1,660 during a year, the direct saving from reduced absenteeism was reported to be \$3,420.

Reduction in accident frequency: Reduction in both accident frequency and severity is reported by many plants as the result of good in-plant health programs, which usually involve a close working relation with safety and health committees. In one small plant, where the lost-time accident rate was reduced from 39.5 percent in 1949 to 7 percent in 1950, the management considers the dispensary as part of its production line, and dispensary visits are encouraged for minor illnesses and for consultations with the nurse. During the first year that a nurse was employed in a plant with 175 employees, there was a 52 percent reduction in lost-time accident frequency and an 82 percent reduction in lost-time accident severity.

One plant with approximately 550 employees states that during the first year a full-time nursing service was provided, the lost-time accident frequency was reduced from 45 to 3 and there were no absences due to infections. Previously, about 300 man-hours a year were lost because of infections from industrial injuries. Another plant of approximately the same size reported that accidents were reduced by two-

thirds from their previous level and that reductions in absenteeism more than covered the cost of the medical department program.

Reduction in labor turnover: In a foundry with 225 employees, the labor turnover was reported as a major expense item; for example, the cost of training an average molder was estimated at \$200. As a result of the in-plant program, the turnover at the plant was reduced, and the plant stated that it could cite definite instances where employees who had left the company returned after a few weeks, principally because of working conditions. In another plant with approximately 250 employees, the majority of them women, the labor turnover was reduced after a nurse was employed from an average of 15 a month to less than 5 a month. A small plant with only 115 employees installed a dispensary at a cost of \$600, and as a result reduced labor turnover 25 percent.

Savings by larger companies often amount to very large sums. At one meeting of the Industrial Hygiene Foundation, a chemical firm was reported to have spent \$21,335 and thereby saved \$87,032. Another organization, the St. Joseph Lead Co., was said to have saved \$25,000 per year for ten years through its health program. At the same meeting, Dr. Harold A. Vonachen, the medical director of the Caterpillar Tractor Company, stated that one phase of his extensive program resulted alone in 25 percent reduction in final compensation settlements. (111)

Dr. Victor Heiser also reports direct evidence that health programs, well planned and operated to fit each set of needs, return many times the investment which companies make in them. According to Dr. Heiser, studies have shown:

1. Only 0.3 of 1 percent of companies studied failed to find their industrial medical program a paying proposition.
2. Ninety-two percent of the companies with occupational disease experience reported reduction in the incidence and severity of cases.
3. Ninety-three percent of more than 1,000 plants, reporting on the effect on compensation insurance premiums, indicated a reduction. Nearly half of these indicated a reduction averaging better than 28 percent. (111)

The value of in-plant health services is also shown by a survey made by the National Industrial Conference Board. Of the 333 companies reporting in the study, 115 stated that they were considering expanding their health services; only 3 companies were considering a program reduction. More than two-thirds of the companies reported that their medical departments had improved employee health and efficiency, promoted safety, reduced absenteeism, assisted in proper placement, and improved employer-employee relations. More than half of them also reported that their programs had reduced employee turnover and the cost ratio of insurance. See appendix table 29.

After weighing the evidence on industrial health services, the National

Association of Manufacturers is said to be convinced that health programs at the plant level are essential to all forward-looking industrial operations. Such programs are reported to pay demonstrable dividends in at least ten ways that are vital to the efficient operation of every company:

1. For employees, a plant medical service means a long step toward good health and good working conditions.
2. It means increased efficiency on the job, both manual and mental.
3. It means less time lost because of illness.
4. It means fewer accidents—health and safety are Siamese twins.
5. For the company, a sound medical service means less money paid out for workmen's compensation.
6. It means a sharp reduction in labor turnover—good working conditions will take you a long way toward attracting and holding the best qualified man for the job.
7. It means more production for each payroll dollar.
8. For your customers industrial hygiene means the increased satisfaction that is produced by healthy teamwork, with every possible man on the job and alert to deliver a product of the best quality in sufficient quantity and on time.
9. A medical program is basic to your whole public relations status. If you do your share toward keeping employees healthy, they will do a far better than average job of speaking loud, often and favorably about their boss, their factory and their product.
10. Finally, plant medical service pays dividends in pride, pride in having everything shipshape, pride in doing the job right, the sort of pride which makes small companies grow into big ones. (66)

Utilization of National, State, and Community Organizations

Employers, physicians, and others who are planning to develop in-plant health programs may not realize either the extent to which services from existing community facilities may be integrated with their program or the wide range of advisory services that are available from national, State, and local organizations. A recent publication of the U. S. Public Health Service describes in some detail the services available from both official and voluntary agencies. (114) The amount of direct service and consultation available from such agencies will vary from State to State and from community to community. In some instances, even though certain services have not been available previously, a request for them may bring about their development with the result that community services are broadened and strengthened.

At the 1952 meeting of the Council of Industrial Health of the American Medical Association, Mr. A. J. Hayes, president of the International Association of Machinists, expressed the belief that the problems of industrial health can be dealt with more constructively if we recognize that they are pieces of the total health picture. Health on the job is but one-third of the picture of the worker's health throughout the day; furthermore, it cannot be separated from a larger consideration of the health of the worker's wife and children, the health of his neighbors and the community. He believes it is important for employers, physicians, and others who are planning to develop in-plant health programs to realize the need for integrating health services within the plant with community activities.

The need for coordination between in-plant and community facilities was also stressed by Dr. Elmer L. Henderson while he was president of the American Medical Association. He looks upon industrial health as a vital factor in bridging the gap between preventive and clinical medicine, and he has stated that the wider application of preventive medicine and hygiene to industry is an obligation of labor and management as well as of the medical profession. According to Dr. Henderson, increased need to utilize available manpower calls for a closer relationship between the medical profession and official agencies dealing with industrial hygiene, workmen's compensation, and rehabilitation. (137)

Official Industrial Hygiene Agencies

The official industrial hygiene agencies which are found in the State health departments in all states except New York, Illinois, and Massachusetts, where they are in the State labor departments, will be of assistance in planning an in-plant program and in advising on personnel

to staff it. Although the agencies vary in the type and extent of services they provide, the services may be outlined briefly as follows:

1. Studies of the working environment, followed by suggestions and assistance in correcting those conditions found to be detrimental to health.
2. Advice to industry concerning the relative toxicity of materials and processes, particularly new substances prior to their introduction into industry.
3. Consultant services to plant physicians, nurses, and physicians in private practice who need help with industrial medical problems.
4. Provision of necessary laboratory service of both a chemical and a physical nature.
5. Health education assistance for management, labor groups, and professional groups to promote maximum understanding and utilization of industrial health services.
6. Assistance to industries in starting in-plant health services and to small plants in organizing services on a part-time or group participation basis.
7. Promotion of adult hygiene programs, particularly in the field of chronic diseases, mental hygiene, rehabilitation, tuberculosis control, and nutrition.

A list of Federal, State and local industrial hygiene agencies is included in exhibit 26 for the benefit of persons who may wish to request services from these units.

State and Local Health Departments

The State and local health departments can be of assistance in many other ways in addition to activities directly associated with occupational health. A recent publication shows the extent to which health departments are entering into new health fields, all of which will be beneficial to workers and many of which can be coordinated with an in-plant program. Examples of such activities are services designed to control diseases and conditions associated with the aging process; rehabilitation and nutrition services; and mental hygiene activities. The publication also reports on special types of health activities performed in each State by official State agencies other than the health departments. In addition, the report includes information for each State on the total and per capita annual expenditures by the health departments and the number of full-time professional and technical workers employed for various health activities by all official agencies. It provides valuable information on the type and extent of consultation and other services that may be available in each State from official agencies. (113)

The extent to which the State health departments participated in various industrial hygiene activities in 1951, and their plans for 1952,

are given in appendix table 31. Many of the States are planning to expand their activities in this area.

Professional Organizations

Both the Council on Industrial Health of the American Medical Association, 535 North Dearborn Street, Chicago 10, Ill., and the Industrial Medical Association, 28 East Jackson Boulevard, Chicago 4, Ill., have a wealth of information on in-plant programs. They are giving special attention to the need for such programs in small plants and will supply materials and suggestions concerning their development. The State and local medical societies, many of which have industrial health committees, are not only a source of information on the medical aspects of an in-plant program, but also have knowledge of physicians experienced in occupational health or desiring to obtain work in that field. The local medical societies likewise know what industries in the community have in-plant medical programs that might be visited with profit.

If the local or State health department or State nurses' association does not have information on available industrial nurses, the American Association of Industrial Nurses, 654 Madison Avenue, New York 21, N. Y., may be able to suggest possible candidates. If part-time nursing is desired, the National Organization of Public Health Nursing, 2 Park Avenue, New York, N. Y., can provide information on the location of visiting nurse societies from which such service is available. Each of these groups can provide consultation and materials concerning the development of employee health programs, including information on the contributions which can be made by other community health and social agencies. A list of the names of directors and addresses of nonofficial agencies providing part-time nursing service to industry in 1950 is given in the appendix in exhibit 15.

Although industrial dentistry has not been developed extensively, information concerning its possibilities and the dentists who have had experience with it may be obtained from the Secretary of the American Association of Industrial Dentists and the Secretary of the Council on Dental Health of the American Dental Association, both of 222 East Superior Street, Chicago, Ill.

Management and Labor Organizations

Offices of the national, State and local organizations of both management and labor can provide information which will be of special value to those wishing to develop cooperative small plant programs. Some of the organizations have experts in the industrial health field who can advise on the formation of such programs.

The Industrial Hygiene Foundation, 4400 Fifth Avenue, Pittsburgh

13, Pa., provides consultation service in this field, and the National Association of Manufacturers, 14 West Forty-ninth Street, New York 20, N. Y., is just completing an extensive survey that will provide information on the extent of such programs, the services provided, and the costs. Additional local information may be available at the State and local chambers of commerce and at boards of trade. Some of these organizations have active industrial health committees.

Additional sources of consultation are the insurance companies which do volume business in compensation and group insurance coverage and who have specialized consultants in such areas as medicine, nursing, and engineering.

The State and local labor organizations have current first-hand information on the existence of and the need for in-plant health services in plants of various types. They also can be of assistance in explaining the advantages of an in-plant program to both employers and employees and in gaining cooperation and support for it. As Dr. Seward E. Miller has stated, the earlier the employees are consulted and the more they participate in the planning of the program, the more they will feel they are active participants rather than passive recipients of it, and the greater its accomplishments will be.

Two large labor federations have materials for distribution and they can supply information on the location of their constituent units. These organizations are the American Federation of Labor, 901 Massachusetts Avenue NW., Washington 1, D. C., and the Congress of Industrial Organizations, 718 Jackson Place, NW., Washington, D. C. An independent labor organization with extensive experience in providing health services is the United Mine Workers of America, 907 Fifteenth Street NW., Washington 5, D. C.

Voluntary Organizations

Voluntary health agencies can be of great assistance to a small plant in the planning and development of an in-plant program. Some of these agencies, such as the tuberculosis association, can bring health services into the plant. Almost all of them have materials that would be useful in health education.

The industrial nurse will improve her consultation service by becoming acquainted with the personnel in the other community health agencies and learning the details of their programs. Because her duties in many instances are closely related to community health problems, the industrial nurse needs to know the functions of the various agencies and be able to refer employees to the appropriate facility.

She can also promote a better understanding of employee health programs by assuming her place as a member of the community health team. For example, this type of integrated program is being carried out successfully in southwest Missouri, where five industrial nurses

and five public health nurses from four counties hold informal meetings at least three or four times a year. The first meeting was held at a small plant where a part-time physician and a full-time nurse are employed. The program included a tour through the plant, luncheon, and an informal discussion of health matters. At the second meeting, which was held in a health center, the community health council provided the lunch. This was followed by a tour of another plant, health movies, and a discussion of services and cost of a health department and of rehabilitation services for persons with arrested tuberculosis.

Many communities have local health councils whose membership usually is composed of professional societies, official agencies, voluntary health organizations, and civic groups. Their object is to coordinate health services and safeguard and improve community health. More than 1,300 local and 34 State councils are now functioning in various parts of the country. In areas without a health council, a similar service is performed by the health division of the local Council of Social Agencies or the local welfare agency. Information on health councils can be obtained from the National Health Council, 1790 Broadway, New York 19, N. Y.

SECTION III

Description of Selected Small Plant Health and Medical Programs

Cooperative Programs

Georgia Cooperative Small Plants Industrial Health Programs

Ninety-eight percent of the plants in Georgia have less than 100 employees. Efforts to bring in-plant health services to the workers in this State have thus been concentrated largely on developing health programs particularly suitable for small establishments. Since 1942 civic and professional groups in the State have worked together to determine practicable approaches to this problem.

Three types of programs have been developed in Georgia to provide in-plant health services to workers in small plants. Under the first program, the *Manufacturers' Health Clinic* at Winder, services were to be provided by a physician and nurse; but since a physician was not available, the service started and has continued with a nurse in charge. Under the second program, the *Griffin Plan*, public health nurses, assigned by the county health department, worked under standing orders approved by the county medical society. Under the third program, the *Petrie Clinic*, care is provided by a physician and nurse. Each of these programs is described individually.

Planning began in 1942, when the Atlanta Chamber of Commerce, moved by the high rejection rate of selectees from the area, took steps to strengthen its health program. First, the chamber reactivated its Health Committee, which had been established in the early 1900's, but had been inactive for many years. This committee immediately obtained the cooperation of other community organizations—the county medical society, State and local public health officials, representatives of the armed forces and of the U. S. Public Health Service, and members of civic and professional groups.

At the request of the Health Committee, the Fulton County Medical Society planned a medical program suitable for industries in Atlanta and other parts of the State. The late Dr. Charles Wesley Roberts, who represented the medical society in this undertaking, outlined a set of fundamental principles upon which discussions were based and a plan was ultimately built. Assistance and enthusiastic support for this plan were obtained by Dr. Roberts, a member of the Board of Trustees of the American Medical Association, from the Association's Council on Industrial Health. The Division of Industrial Hygiene of the United States Public Health Service and the United States Chamber of Commerce also helped develop the plan, and both the Georgia Institute of Technology and the Emory University Medical School have

actively sponsored it. The Liberty Mutual Insurance Company contributed professional and research facilities, its vice-president, Mr. William N. Seymour, having become extremely interested in the project in 1949.

As the work progressed, labor unions, insurance agencies, professional schools, and civic groups became interested. All were represented on the Industrial Health Steering Committee of the Atlanta Tuberculosis Association, the organization through which differences of opinion were ironed out and mutual agreement on the final plan was reached.

Legal advice on the proposed program was obtained from the director of the Bureau of Legal Medicine of the American Medical Association and the legal counsel of the Fulton County Medical Society. In 1946, the proposed cooperative plan under which small plants would pool their resources was reported in detail to the House of Delegates of the Medical Association of Georgia and to the Board of Trustees of the Fulton County Medical Society. The plan received their unanimous approval. In 1950, both of these organizations reaffirmed their support of the plan.

Dr. Raymond Hussey, scientific director of the AMA's Council on Industrial Health, visited Atlanta and studied the proposed plan in detail. He reported that it had been conceived in the best spirit of preventive medicine and that it indicated vision worthy not only of organized medicine's approval but also its hearty support.

In 1950, General A. W. Vanaman, commandant of the Industrial College of the Armed Forces, commented on the plan as follows: "Your suggestion to emphasize the matter of health as a factor in increasing the effectiveness of manpower is sound and certainly merits attention in any studies dealing with manpower as applied to mobilization, whether economic or military."

The Petrie Clinic

The Petrie Clinic, more so than the other two programs, makes full use of the principles recommended by the Georgia civic and professional groups for a cooperative health program for small plants. At a meeting on November 1, 1949, executives from 14 firms in Atlanta signed cards, stating that they were interested in pursuing further the possibility of establishing a cooperative industrial health center. Two firms, the Atlanta Oak Flooring Company and the Warren Company, recruited another in their neighborhood, the Williams Brothers Lumber Company, and established the first clinic in this area. The three firms range in size from 100 to 500 employees and have a total average employment of 750 persons.

Under the plan, several small firms jointly agree to establish and support a health center which is adequately staffed and equipped and conveniently located. The cost of the center is prorated among the participating firms according to the number of workers employed and

the services provided to their employees. The management of the center is invested in a "Board of Control" representing the participating firms. Professional guidance is provided by an advisory board composed of representatives of the Georgia Institute of Technology, Emory University, the Atlanta Federation of Trades, the Atlanta Tuberculosis Association, the Liberty Mutual Insurance Company, the Fulton County Medical Society, and the Division of Occupational Health of the Georgia Department of Public Health.

In addition to the jointly-supported center each firm maintains a dispensary where the nurse from the central clinic is on duty a specified amount of time.

The clinic, which is named for Dr. Lester M. Petrie in recognition of his efforts to promote small plant health programs during his ten years as director of the Division of Occupational Health (previously called the Division of Industrial Hygiene) in the Georgia Department of Public Health, began operation in August 1950. It is located in two rooms near the plants that it serves. There is a combination nurse's office and treatment room and a combination doctor's office and examination room. A station wagon to facilitate emergency treatment and for routine transportation may be added later. Ultimately, the addition of a mobile clinic, such as those successfully used in the Public Health Service, may also be considered.

MEDICAL STAFF. The minimum staff recommended by the committee includes a full-time physician or equivalent services by part-time physicians, one nurse for each 300 employees up to 1,000 and an additional nurse for each additional 1,000 employees, a trained first-aid worker or nurse in each participating industry, and clerical help as needed. Technical specialists, such as safety and industrial hygiene engineers, may be added to the staff as the center develops.

At present the Petrie Clinic has a part-time physician paid on a retainer-fee basis, who spends two hours a day, five days a week at the clinic. A full-time nurse assists the physician in providing services at the clinic daily and visits each plant once a day.

SERVICES PROVIDED. The services recommended by the Georgia civic and professional group to be provided by a fully developed cooperative clinic are as follows:

1. Industrial health examinations—pre-placement, periodic, and special—of all members of the establishment.
2. Selective placement of workers—matching the abilities of the worker to the demands of the job.
3. Prompt emergency treatment of on-the-job accidents and illnesses, with the referral of other illnesses to private physicians.
4. Professional nursing services for ill employees, health education, home visiting, and the execution of the attending physician's instructions.

5. Other technical services, such as engineering studies of environmental health and safety hazards of the plant.

6. Adequate records (including confidential personnel health records), which will be the basis for analyses of absenteeism, turnover, and types of disability, defense against fraudulent disability claims, and honest evidence of just claims.

7. Coordination with, and full utilization of, the social and health services of private and governmental agencies and resources.

Services at the Petrie Clinic now include pre-placement and periodic physical examinations for all workers, and special examinations when they are necessary. Treatment is provided for industrial injuries and illnesses and for minor nonindustrial illnesses, with referral to a private physician when extended treatment is necessary. Employees may receive cold vaccine and other immunizations if they so desire. The nurse gives instructions in health education, and the physician assists in the placement of employees. Health records and reports of services are maintained on an individual basis at the clinic. When at the plant, the physician or the nurse, acting under the physician's orders, provides first-aid and emergency services; all other services are provided at the clinic.

During the first year that the clinic was in operation, August 1950 through July 1951, the following services were provided. Taking into account part-time employment, these services were available to the equivalent of 750 full-time employees.

Item	Number	Rate per 1,000 employees
Health examinations:		
Pre-placement.....	134	178.7
Periodic.....	373	497.3
Patient visits to clinic at which physician or nurse gave care:		
Total.....	5,194	6,925.3
First visits:		
Industrial.....	1,295	1,726.6
Nonindustrial.....	957	1,276.0
Revisits:		
Industrial.....	2,338	3,117.3
Nonindustrial.....	604	805.3
Visits at which physician gave care.....	1,239	1,652.0
Workmen's compensation cases.....	84	112.0
Referrals to private physician.....	46	61.3

FINANCING. To inaugurate the program the participating industries each contributed \$1 per employee and a portion of the cost of the clinic's equipment. The clinic uses rented space. The committee estimated, however, that a clinic to serve 2,000 employees would require 2,000 square feet of space and that in 1950 it could be constructed for \$20,000.

To encourage the project, an insurance company paid the nurse's salary during the first few months that the clinic was in operation. Thus, the industries had to pay only 50 cents per month per employee

during this period. Each plant now pays 75 cents per employee per month for services. The capital and operating costs of a program of this kind will necessarily vary with the location of the industry and the scope of the program.

The committee estimated that the operating costs of a cooperative program would amount to \$1.20 per month per employee for a group of 1,000 employees; \$1 per month per employee for 2,000 employees; and less for a group as large as 5,000. This cost estimate presumes an annual salary of \$8,000 for a full-time physician, and \$2,500 for a nurse. A detailed breakdown of estimated costs for programs covering 1,000, 2,000 and 5,000 employees appears in the appendix in table 27.

VALUES. Although the clinic has been in operation less than 2 years, the following statements made in March 1952 by three of the participating companies indicate the value of the program:

Williams Bros. Lumber Co.—Mr. Wendell Williams, one of the partners: "Less absenteeism, lower compensation insurance rates, happier and more cooperative employees. Better understanding between the foremen and the other employees because they now realize that the foremen are interested in their personal welfare."

Warren Co., a manufacturer of walk-in refrigerators—Mr. L. S. Venable, assistant to the president: "Our employees are enthusiastic over the benefits they have received from this program. From management's viewpoint we have seen that prompt treatments have paid off as to preventing loss of time in getting treatment and in the prevention of conditions that quite possibly would have resulted in absenteeism."

Atlanta Oak Flooring Co.—Mr. D. E. Clark, owner: "We were quite interested in helping to get this project started. We are very pleased with it, and our experience fully justified the initial cost. We think it pays and can't understand why other small industries do not have such a plan."

At the time one company joined the group, it had a compensation case under treatment which had already cost over \$3,000. This expense had resulted from an infected scratch on the employee's leg. One simple treatment and dressing at the time that the injury occurred would have saved enough money to carry the entire costs of the clinic (doctor's retainer fee, nurse's salary, equipment, supplies and rent) for several months.

In the opinion of Dr. Petrie, the plan developed in Georgia and now in operation at the Petrie Clinic "represents private enterprise in action, small industries joining hands with the professions in a positive program for health maintenance of all America's labor force, the sinews of our free way of life." He believes that, when such a program is designed to render both medical and environmental health service to industry, as well as to train new professional workers and provide research opportunities through professional schools, any employer, regardless of how small the number of his employees, can secure health maintenance service comparable to the best of the wealthiest corporations.

Manufacturers' Health Clinic, Winder, Ga.

The oldest cooperative industrial health center in Georgia, this clinic was established in 1943 to serve six firms with an average total employment of 1,200 persons. Since then, a seventh firm has joined the plan. Five of the cooperating firms are clothing manufacturers, and two are furniture manufacturers. The largest employs approximately 550 workers and the smallest, about 50.

The late Dr. W. L. Mathews, then serving as Barrow County health officer, sponsored the program in October 1942, and both the local health department and the industrial hygiene division of the State health department participated in organizing it. With the help of the county public health nurse, Dr. Mathews arranged a meeting which was attended by representatives from the State health department, the county boards of health and education, and executives from the local industries. This group later established a board of directors with elected officers.

The participating industries agreed to finance a cooperative health clinic, each contributing in proportion to the number of its employees. An industrial nurse was employed, and a portion of the fourth floor of the local bank building was converted into a clinic.

SERVICES PROVIDED. As originally planned, the services were to include routine pre-placement and periodic physical examinations of all employees by a physician. Through periodic plant inspections, the physician was to acquaint himself with the job requirements of all participating industries. Dr. Mathews' ensuing disability and the acute shortage of physicians in the community made this part of the program impossible. A clinical program with the nurse providing services was begun as a temporary measure and is still in force. The nursing program is broadly outlined in the following seven points:

1. Quarterly meetings of the nurse with the board of directors to report on activities, and discussion of immediate problems and plans for future development.
2. Establishment of routine program whereby health inspections, conferences, and redressings are conducted at a specified time of day, thus leaving the nurse some free time for tours of the plant and contacts with management and community organizations.
3. Training, organization, and supervision of first-aid workers. Daily visit to each first-aid station by the nurse.
4. Routine inspection of the plant, to be made at stated intervals for the purpose of observing unsafe practices, general housekeeping and hazards, maintenance of rest rooms, etc.
5. Establishment of a cross-index card system for the purposes of adequate follow-up with the workers for correction of remediable defects, redressings and retreatments, and individual conferences.

These records provide a guide for health education of the worker where indicated.

6. Use of county and State health department services, such as maternity classes and well-baby clinics of the county health department, and periodic chest X-ray survey of all employees by the State health department, with all suspected cases of tuberculosis or other disease followed up by the clinic nurse in cooperation with the health department.

7. Development of health education program, including home visiting by nurse.

Under the current program, services are provided by the nurse in a well-equipped two-room clinic. One room is a combination office and reception room; the other is used for examinations and treatments. In addition, five of the participating industries have first-aid rooms. These are simply furnished with a cot, small table, cabinet, and sink. A few basic medications and bandages are kept in the first-aid room. The nurse visits the first-aid rooms during the morning and spends the afternoon at the clinic except in cases of emergency.

Services include health inspections of employees, first aid, redressings for injured employees, and care of minor nonindustrial illnesses. The nurse also conducts first-aid classes, checks on environmental health conditions, and refers employees with health problems to physicians and to State and county health departments.

One-hour classes in first aid are held twice weekly for two months each year. All first-aiders take weekly turns in assisting the nurse during her daily visits to the first-aid stations. It is reported that the plant executives have become very much interested in the possibilities of this service and that all participating industries now have trained first-aid workers.

New employees are sent to the clinic for health inspection within a day or two after they are employed. A routine inspection includes visual and hearing tests; determination of height, weight, and pulse rate; urinalysis; drawing of blood for hemoglobin determination and serologic test for syphilis; and a check of obvious deformities. The nurse refers the individual to his private physician if any abnormality is found, and returns the health inspection request to the personnel officer with appropriate notations.

An individual file is kept by the clinic nurse for each employee. Records also include a daily log of services performed by the nurse and the first-aid workers. This information is transferred to the individual records and is consolidated into monthly and annual reports. Services provided by the nurse at the Manufacturers' Health Clinic in 1950 to an average of approximately 1,300 employees eligible for care included the following:

Item	Number	Rate per 1,000 employees
Health inspections:		
Initial.....	210	161.5
Periodic.....	268	206.1
Treatment:		
Injuries.....	1,302	1,001.5
Illnesses.....	1,775	1,365.4
Immunizations.....	1,007	774.6
Urinalyses.....	573	440.8

During the year, the nurse referred 162 employees to their family physicians, 77 to their dentists, and 36 to optometrists. She also had 167 conferences with physicians and dentists and 401 with industrial officials and others associated with management, gave one course in first aid for 10 selected workers, and led 8 discussions on health subjects which were attended by 1,871 employees.

First-aid workers supplemented the nurse's services by providing more than 10,000 treatments during the year—5,124 for injuries, 4,476 for illnesses, and 1,050 for unidentified causes.

Outside agencies provided the following services: blood serology, 242; sputum examinations, 32; chest X-ray, 41; care for medical rehabilitation cases, 5.

FINANCING. The participating firms contributed sufficient funds, on a pro rata basis, to establish and equip the clinic. Current contributions for operating expenses amount to 27 cents per month per employee. About 60 percent of the sum is for the nurse's salary; about 15 percent, for rent; and the balance, for medical supplies and administrative items.

ADMINISTRATION. The clinic is an incorporated organization with a board of directors consisting of one member from each participating industry. The professional aspects of the program are under the supervision of the local medical society and are based on written standing orders signed by the ten physicians in the county.

The industrial hygiene service of the Georgia Department of Public Health has assisted in administering the project. It surveyed the environment of each plant from a sanitary and health standpoint, developed the records, outlined the nurse's duties, and arranged for mass chest X-ray examinations of all employees. It continues to provide consultation service, especially through periodic visits by an industrial nursing consultant.

VALUE OF THE PROGRAM. According to Dr. Petrie, the benefits of the clinic have been equally great for both owner and employee; greater production at less cost, on the one hand, and less suffering and improved morale, on the other.

The Griffin Plan, Griffin, Ga.

This program was established in 1947 and remained in operation until July 1950. Conducted jointly by the Spalding County Health Depart-

ment and local industries, the plan served seven mills with a total average employment of 4,000.

This program was conceived in 1946 when the general manager of the Crompton-Highlands Mills advertised for an industrial nurse. When the health commissioner, Dr. T. O. Vinson, saw the advertisement, he called on Mr. H. A. Pickford, the general manager, to discuss with him the qualifications and duties of industrial nurses and other phases of an industrial health program. Out of this discussion grew the idea of utilizing the public health nurse of the local health department to service the plant as well as the mill village. Members of the local medical society, the regional nursing consultant of the Division of Industrial Hygiene of the State health department, the supervising nurse of the local health department, and the plant executive consulted with Dr. Vinson and Dr. Petrie to develop details for the project.

The resulting agreement included the following provisions:

1. The Spalding County Health Department shall assign a generalized public health nurse, for a part of each day, to serve each industrial plant.
2. Each plant shall contribute its proportionate share of the nurse's salary to the health department.
3. The nurse shall be supervised by the Spalding County Health Department.
4. All medicines and treatments administered in the plants and in the homes shall be on an individual basis and only on a prescription from the family physician.
5. First aid and other procedures shall be carried out according to written standing orders approved by the medical society.
6. Accident victims and persons found to have signs and symptoms of disease shall be referred to private physicians as indicated.

Health rooms were established in each of the participating plants and were used not only as nursing centers for the employees, but also for child health conferences and other community-wide public health services. One firm, the Rushton Mill, designed and built a center where all persons in the immediate area were served irrespective of mill connections.

NURSING PERSONNEL. The Spalding County Health Department has seven health districts, with one public health nurse assigned to each. The cooperating firms were located in five of the districts. After the project had been in operation about a year, a time study of the activities of the five public health nurses serving these districts showed that approximately 34 percent of their time was spent in industry, 9 percent in other clinics, 9 percent in schools, and 24 percent in home visits. Three mills having a total employment of 1,050 were located in one district, and the nurse assigned to this district devoted 45 percent of her time to industrial work. The other four districts contained only one mill each; in two of these the nurses devoted 25 percent of their time

to industrial work, serving 700 and 800 employees each. The other two mills, which had the smallest and the largest number of employees, 400 and 1,050, each received 36 percent of the time of the nurses assigned to their districts.

SERVICES PROVIDED. In accordance with the terms of the agreement, first aid and other medical care provided by nurses at the plant clinics were carried out under written standing orders approved by the county medical society. Accident cases and persons with symptoms of disease were referred to their private physician, and medicines and treatments administered in the plants and in the homes were by prescription from the family physician.

Physical inspection of new employees was one of the nurses' principal duties. This inspection included vision and hearing tests; blood pressure reading; temperature, pulse and respiration recording; and observation of the individual for obvious physical defects. Blood specimens were drawn for serological tests; hemoglobin concentration was determined; and a urinalysis was made. Where indicated, sputum and stool specimens were sent to the State laboratory for examination.

Arrangements were made with the health department to take the X-ray machine to the plants at scheduled intervals during the year to X-ray all personnel. A new photofluorographic X-ray machine was purchased by the health department, with each plant contributing \$1 per employee toward its cost. All positive findings were reported to the employee's private physician, and the nurse followed through on the physician's orders, as indicated, and worked with local and State resources in helping to secure maximum rehabilitation.

VALUE OF THE PROGRAM. Comments on the program by some of the participants were as follows:

County Health Commissioner: "Until the nurses were assigned to the individual centers, we reached only a few of these industrial people through our service and educational programs."

Nurse: "It's hard work and poor pay, but it's good public health and I love it. The doctors are interested and give us good cooperation."

Vice president of Rushton Mills: "The program is well worth the cost in giving employees peace of mind and a sense of security. They and their families and neighbors know where to turn in time of trouble, realizing the resources of both mill and health departments are at their command . . . Success or failure of the entire program depends upon the nursing personnel."

Private physician: "The medical society has discussed this plan on numerous occasions. When put to a vote, it was endorsed unanimously. I much prefer having the industrial nurse under medical supervision to having a free lance nurse under lay direction. It is a great convenience to us to have a nurse on the job to take care of emergencies until we can get there."

Employee: "I am so happy to have the nurse here in the mill because of her personal interest in my health and that of my family."

An analysis of the program by State industrial and public health medical and nursing personnel concluded with the following statement: "We are the first to recognize that there are weaknesses in the program.

Of major importance is on-the-job medical direction. Efforts have been made to secure part-time medical service from among the local medical group. Adequate educational advantages for the nursing personnel is another lack. . . . Other deficiencies both real and potential are recognized, but . . . a start has been made. The good features of the program far outweigh the poor ones. The present service, even with its inadequacies, is very much better than conditions prior to the plan. Had it been postponed until all imperfections were corrected, 'The Griffin Plan' would never have started."

The program was terminated when the mills withdrew their financial support about June 1, 1950. A major difficulty was the lack of a physician directly associated with the program and on duty at each mill at specified time periods. As a result of the lack of medical direction a strong program of preventive services could not be carried out. Consequently, management had no opportunity to observe the full value of an in-plant health program and therefore decided to withdraw from the cooperative project with the health department.

When the mills abandoned the idea of a complete health service, they planned to employ their own nurses who would concentrate their efforts on home nursing and first aid in the plant. However, at the end of 1952, none of the mills had established such service. This may be due to the fact that the new health officer of Spalding County, in cooperation with the mills, is hopeful of revitalizing the project under a different plan of operation which is yet to be worked out.

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Small Plants Health Demonstration Program

Astoria-Long Island City Area

Queens County, N. Y.

This 12-month experiment which grew out of the war effort began operating early in 1945. It covered seven plants having from 75 to 700 employees each and an average total employment of 2,000 in 1946.

To perform additional services, which the control of occupational health hazards in war plants made necessary, the Division of Industrial Hygiene and Safety Standards of the New York State Department of Labor requested lend-lease personnel from the U. S. Public Health Service. A physician, an industrial nurse, a chemist, and an engineer were supplied by the Service for each of the two branch offices which the Division established, one in Syracuse in April 1943 and the other in Astoria in July 1943.

At Astoria, the new office cooperated with the New York City Health Department in sponsoring an experimental program having as its objective the improvement of employee health through control of environmental health hazards and industrial health problems.

The jointly sponsored project, known first as the Industrial Health Unit and later as the Office of Industrial Health, engaged in numerous activities during its first year of operation. One of its first projects was the surveying of in-plant health services in the Long Island City area, which revealed the great need for additional programs. While some of the larger industries had such services, they were generally lacking in plants with less than 500 employees.

Of the 97 plants surveyed, only one employed a full-time physician; of the 26 plants with more than 500 employees, 16 employed part-time physicians; of the 70 plants with less than 500 employees, only nine had part-time physicians. At the time of the survey, 57 percent of the 116,194 industrial employees in the Queens area were in approximately 2,000 small plants with less than 500 employees; the remainder were in the 41 plants with more than 500 employees.

Dr. Frank A. Calderone, then deputy commissioner, New York City Department of Health, and Dr. Leonard Greenburg, executive director, Division of Industrial Hygiene and Safety Standards, New York State Department of Labor, had for several years been discussing the possibility of establishing a joint demonstration project to further the development of in-plant health programs in small plants. They crystallized their plans, and as soon as the Astoria branch office was well established, it assumed responsibility for managing such a program.

The Demonstration Program in Operation

The program was carefully planned and supervised, and in addition, it received expert advisory and consultation services. Although orig-

inally it was to be only one of the Astoria office's projects, it soon utilized the full-time services of two staff members, Dr. Nathan Millman, the industrial physician, and Miss Veronica Donnelly, the industrial nursing consultant. The staff and facilities of both the New York State Labor Department and the New York City Department of Health were available at all times and were fully utilized. A distinguished advisory committee, which was appointed well in advance of the initiation of the project, also contributed greatly to the experiment.

Dr. Calderone, Dr. Greenburg, Dr. Millman, and Miss Donnelly assumed responsibility for interesting small plants in the experiment. At first this was difficult, and, to encourage cooperation, in-plant nursing services were offered without cost to plants agreeing to cooperate in the program. Through Dr. Calderone's efforts, the New York City Health Department agreed to supply seven public health nurses to work in the plants. In addition to nursing service, the city health department also provided diagnostic services, such as blood tests and chest X-rays, and consultation services on nutrition, sanitation, statistics and other subjects.

On the basis of the available personnel and other considerations, the sponsors decided that seven plants would be included in the demonstration. They represented a variety of business: namely, food processing, printing, and the manufacture of porcelain products, paints, amusement machines, chemicals, and carbon parts.

Each plant arranged for services by a part-time physician and provided a fully equipped in-plant medical department. Plant management also agreed that one employee at each plant would be trained in first aid for emergencies and that environmental hazards would be controlled as recommended by the Division of Industrial Hygiene in accordance with the provisions of the labor law and the industrial code rules. Plant health committees were organized as a means of securing the interest and cooperation of employees and executives.

The majority of the health services were provided in the plant by the physician and the nurse. Working as a team, they maintained contact with the plant executive responsible for the medical department, served as ex-officio members of the plant health committee, and developed good public relations through liaison with private physicians and outside groups having relationships with the program.

In four plants the medical department was responsible to the vice president; in the other three it was responsible to the secretary-treasurer, to the director of industrial relations and personnel, and to the plant manager, respectively. In every plant the medical director had direct access to the president, but medical information was considered confidential and was kept under lock when the physician and the nurse were absent.

MEDICAL STAFF. The staff of the Office of Industrial Health, under the immediate direction of the Division of Industrial Hygiene and

Safety Standards and the city health department, provided technical supervisory service for the program. Dr. Millman and Miss Donnelly spent most of their time during the first six months of the experiment setting up and supervising the plant programs. Later they visited the plants twice a month and held weekly conferences in the Office with the nursing staff.

Care in the plants was provided by six part-time physicians, one of whom served two plants, and by seven nurses. Four nurses each served full time in separate plants, and one nurse served two plants. Two nurses served the seventh plant, which had more than 500 employees and paid the second nurse's salary. In this plant part-time clerical services were also provided to the medical staff.

The amount of time spent in the plants by both the physicians and the nurses was in accordance with experimental time standards. Physician's time was estimated on the basis of 3 hours per week per 100 employees; and the nurse's time, on the basis of 9 hours per week per 100 employees.

As the program developed, the physician's time was reduced to two hours in two plants, while the nurse's time exceeded the estimated nine hours. Experience proved, however, that the original estimate of three hours of physician's services is necessary for a complete program, and that the nurse's time may rise to as much as 15 hours per week per 100 employees in plants with special problems.

Of the six physicians serving the participating industries, five were in private practice in Long Island City, within walking distance of the plants they served, and one was located in Manhattan. The Queens County Medical Society signified its interest in the experiment by arranging a register of local physicians who had experience or were interested in industrial health. It also conducted a series of 11 lectures on various aspects of a complete industrial health program. Upon request, the society provided the participating plants with the names of qualified physicians from which to make a selection. Two physicians who were already associated with the plants continued their services and took the course given by the medical society.

Public health nurses to serve in the plants were selected by the nursing consultant of the Office of Industrial Health on the basis of personality, previous experience, education, maturity of judgment, and interest in the program. At first, young nurses with only 2 or 3 years of experience were chosen, but later it was realized that nurses with more mature judgment were preferable. A 6-week orientation course preceded assignment to duty with the plants.

In the absence of the doctor and the nurse, emergency care was provided by a first-aid worker who received additional instruction from the plant physician and nurse. Emergency complaints and treatments were recorded by the first-aid worker, and the patients were seen again the next day by the nurse or the physician.

SERVICES PROVIDED. In general, services provided at each plant conformed to the following recommendations as to the essentials of an adequate health program:

1. Complete physical examination of the worker upon employment, including a routine chest X-ray, serology test, hemoglobin determination, and urine examination.
2. Treatment of occupational conditions and emergency treatment of non-occupational ones.
3. Health consultation and advice regarding any health problem.
4. Periodic complete physical examination.
5. Suitable referral service to private physician or agency.
6. Periodic plant surveys.
7. Organized programs concerned with nutrition, health education, accident and absence studies, and other health activities.

A complete pre-placement examination was given applicants at five plants. At two plants, where the labor turnover was rapid, a brief screening examination given prior to employment was followed by a complete examination within two weeks. In all plants, examination findings were used as a basis for job placement.

Complete periodic physical examinations, patterned after the original pre-placement examination, were also provided by all plants. On their birthdays, employees were sent a card, suggesting that they report for their annual examination; practically all of the employees responded. In addition, frequent physical examinations were received by all employees with physical defects and those exposed to known toxic substances, the frequency depending upon the nature of the case.

Employees returning to work after an injury or illness, either occupational or non-occupational, reported to the medical department for such physical examination as the nature of the injury or illness indicated. In general, this procedure was highly endorsed by the workers.

Treatment of occupational cases varied with the hazards of each industry. All employees had the option of being referred to private physicians for care of occupational diseases and injuries, in accordance with the New York State Workmen's Compensation law. Several plants provided complete care for certain cases, at the request of the employees. Severe occupational accident or illness cases were hospitalized. All plants had arrangements for such service with St. John's Hospital, Long Island City. They also had arrangements for prompt ambulance service and for referral to specialists or specialty clinics. In New York State, employees have free choice of physicians for the treatment of occupational injuries and diseases. When they use the services of a plant physician, they must do this by election and must signify in writing their intention to employ such services.

Treatments for nonindustrial illnesses and injuries were limited in all plants to emergency care. Employees needing more extensive treatment were referred to their family physician. All plant physicians

made dental inspections, with referral to private dentists for reparative work. Health counselling was available on all types of problems and always followed physical examinations in which the findings indicated the need for treatment and advice by the family physician. For some illnesses, such as venereal disease, treatment by a private physician was mandatory for continued employment. Referrals to family physicians and official and nonofficial health agencies were made by plant medical personnel on a special form.

Although the health education programs varied in content, all plants recognized their value. One of the subjects generally emphasized was nutrition; six of the seven plants had a nutrition program, which included instruction in dietetics by the medical personnel. The medical personnel in each plant also acted as advisors to the plant safety and health committee.

In-plant medical services were supplemented by group health insurance in all but one plant. In two plants, benevolent associations provided weekly cash indemnity benefits in case of illness or accident.

VISITS TO MEDICAL DEPARTMENT. Visits to the medical departments in all plants averaged slightly less than one per month per employee. A tendency to higher rates in plants with full-time nursing service was attributed to the fact that employees will use such service when it is made available to them.

During a 10-month period, about 16 percent of the visits made to the medical departments were for physical examinations; the remainder were for occupational and non-occupational services which the medical department provided.

FINANCING. Only one of the participating plants had a first-aid room prior to the experiment. In the other six, individually designed and fully-equipped medical departments were established in accordance with recommendations made by the Office of Industrial Health. These departments, which ranged in size from 80 to 600 square feet, were paid for by the plants. In 1945, the demonstration year, the cost of constructing and equipping them ranged from \$550 for a temporary structure to \$3,667 for a 7-room department built to serve 350 employees. A fairly complete 2-room department cost about \$1,000. On the basis of a 10-year depreciation, the average cost of equipment and facilities for all plants was \$1 per year per employee. The details on cost of construction and equipment are given in table 28 in the appendix.

The combined annual per capita cost of physician's services, of nurses' salaries (which were paid in the New York City Health Department during the 12-month period), and of medical supplies amounted to \$13, the equivalent of 0.7 percent of the annual wage of the seven plants. This figure, however, must be viewed with caution by groups developing similar programs, because of the variety of consultation and promotional services that were provided without charge to the plants.

About 68 percent of the \$13 was spent for treatment and advice, 14 percent for physical examinations, and 18 percent for other services.

Physicians were paid at the rate of \$5 to \$10 per hour; the average rate for the seven plants was \$7 per hour. The variation in annual payment according to size of plant and amount of service was as follows:

Number of employees	Total hours in plant each week	Number of sessions per week	Annual payment
100	4	2	\$1, 200
200	5	3	1, 800
700	20	5	4, 500

Nurses were paid from \$1.09 to \$1.50 per hour, according to length of service with the local health department. This compared with the hourly rate of the local visiting nurse service of \$1.50 when services were offered in units of three hours each. The visiting nurse rate, however, included features not considered in the cost of nursing service in the demonstration project, such as supervisory and other administrative expenses, the provision of a substitute nurse in case of illness, and compensation coverage for accidents. Medical supplies cost each plant between \$5 and \$10 per month.

RECORDS. Uniform record systems were set up in all plants. Forms were devised and supplied by the Office of Industrial Health; but plant managers were consulted regarding the type of information they wished to obtain, and these suggestions were incorporated into the records. As the demonstration program developed, changes in the forms were made to improve reporting. Each plant provided the Office of Industrial Health with a monthly statistical summary of all health activities, including a breakdown of visits to the medical department by type of visit and by plant department, a narrative report, and minutes of the plant health committee's meeting.

PLANT HEALTH COMMITTEE. Prior to its establishment, the program was discussed with the union at each plant, and a health committee was set up, consisting of representatives of plant management and labor. A typical committee included a plant executive, the plant manager, the chief union steward, the head of the maintenance department, several workers, and several foremen, with the doctor, nurse, and personnel director as ex-officio members. A three-member subcommittee on safety made a periodic inspection of the plant and made a combined report on safety hazards. The committee in each plant held monthly meetings and was instrumental in interpreting the purpose of the medical department, in stimulating interest on the part of both management and labor, and in helping to solve plant health and safety problems which were brought to light by technical industrial hygiene surveys.

Present Status of the Plant Programs

At the end of the one-year demonstration period, each of the seven plants participating in the experiment decided to continue their medical program and assumed the cost of providing nursing service. Four of the plants still operate a medical department. Of the others, two plants are no longer in business; and in a third plant employment is said to be too low to warrant continuation of medical services. A brief summary of the programs now operating follows:

Item	Plant No. 1	Plant No. 2	Plant No. 3	Plant No. 4
Approximate number of persons employed:				
1951.....	300	200	500	200
1945.....	350	200	700	100
Physician-hours per week:				
1951.....	5	5	8	4
1945.....	5	5	20	4
Nursing hours per week:				
1951.....	27	26	40	10
1945.....	27	18	80	7

Two physicians are still serving the plants with which they were associated during the experimental period.

Plant No. 3 still employs the full-time nurse who was with it during the experiment. In the other three plants, nursing service is provided by the Visiting Nurse Service of New York.

The plants have continued their physical examinations, preventive services, nutrition and other health education programs, and periodic plant tours of the plant by medical personnel. One plant reports a very active health and safety committee, one has enlarged its medical department, and another has moved its department to a better location.

Accomplishments of the Program

Various persons associated with the program have pointed out its accomplishments. Dr. Greenburg and Dr. Calderone, who developed the original plans, and Dr. Millman and Miss Donnelly, who were closely associated with the program, all have emphasized one or more of the following achievements:

1. All workers received pre-placement examinations which were used in effecting proper job placement.
2. The pre-placement and periodic physical examinations brought to light a number of physical defects. Each month from 6 to 10 percent of all cases seen in the medical department were referred for treatment or advice, about 75 percent of them being referred to the family physician.
3. Serious cases found and placed under treatment included: Syphilis, 46; acute gonorrhea, 2; tuberculosis, 18; cardiacs, 71; diabetes, 9; hernia, 30; renal, 22; gastro-intestinal, 5; cancer, 4; neuro-mental, 7; severe anemia, 3; and malaria, 3.
4. Absences due to both occupational and non-occupational illnesses

diminished in each plant, with as much as a 50-percent reduction in one plant.

5. Although the demonstration period was too short to reflect a reduction in compensation costs, three plants were told by their insurance carriers that they might expect a substantial reduction in their premium in the near future.

6. Labor-management relations were greatly strengthened by the program.

In describing the accomplishments of the program, Dr. H. P. Mencken, chairman of the Public Health Committee of the Queensborough Chamber of Commerce, said: "Absences and labor turnover are lessened. A medical program helps to properly place handicapped individuals, especially veterans, in jobs they can safely perform. It helps to improve the healthfulness of the working environment in the plant. It renders advice concerning various health problems including fatigue, worry, and proper food. All of these factors build good will for the company."

Evaluation of the Program

The program demonstrated that services can be provided in small plants at a reasonable cost, that it is often difficult to persuade small plant managers of the value of such programs, and that failure to continue in-plant programs is usually due to causes other than lack of appreciation of the program's value. As a result of the demonstration, the people most closely associated with it concluded that:

1. Industrial employees can be given the benefits of preventive health measures even though they work in comparatively small plants.

2. The initiation of a cooperative program requires the joint action of various community groups, official as well as unofficial.

3. The effective conduct of such a program also requires proper plant organization.

4. A well-organized health program requires constant supervision, which can be suitably furnished by a local official industrial hygiene agency.

5. A program for small plants is economically feasible and, if properly conducted, results in various benefits to the employee, the employer, and the community.

Dr. Greenburg, in discussing the project, recently stated that it demonstrated the feasibility of establishing successful in-plant programs in small plants. He said that the project clearly showed that a working program could be developed in a relatively short time by those familiar with the problem, and that, moreover, the costs were not excessive and could be reasonably met by most plants in successful operation. The results of the project supported the view that important and serious cases of illness could be found and placed under treatment. Dr. Greenburg listed as follows the elements which he considered essen-

tial to the successful establishment and continuation of small plant programs:

1. Community cooperation and interest.
2. Contact with high level officials of the plant organization.
3. The active support of the local medical society.
4. Intelligent planning so as to maintain a simple and not too elaborate program compatible with small plant operation.

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Hartford Small Plants Medical Service Hartford, Connecticut

The program was established in April 1946 to serve six industries, having at that time between 165 and 764 employees each, and a total of 3,561 employees. Five of the original industries and three additional

industries are now being served. Average total employment in the eight industries in 1951 was 3,377.

In 1941, a partial survey of industries by the Joint Committee on Industrial Health of the Manufacturers' Association of Connecticut and the Connecticut State Medical Society showed the inadequacy of in-plant health and medical services available to workers in Connecticut industries with less than 500 employees. Several years later, the Hartford Small Plants Medical Service was planned by a group of manufacturers and physicians who met at the request of one company executive to discuss the possibility of meeting the medical needs of several small plants on a cooperative basis. A representative of the Connecticut Manufacturers' Association; Dr. Albert S. Gray, then director of the Bureau of Industrial Hygiene, Connecticut State Department of Health; and Dr. Ronald Buchan, then senior assistant surgeon (R) U. S. Public Health Service, were among the group.

Consideration was given to establishing a centrally-located clinic, complete with laboratory, X-ray and other equipment, to be operated by salaried staff. This proposal was endorsed by both the Connecticut State and Hartford county medical societies on condition that treatment be given only to employees. The capital cost was estimated at \$15,000, with operating budget averaging \$12 per year per employee, for a program covering 3,000 employees. After further study, however, the clinic idea was given up as impractical on the grounds that a central clinic would be too expensive to set up and operate; that it would represent an inadequate substitute for an in-plant first-aid room; and that it could not render quick and convenient service, thereby interrupting production by taking employees away from their jobs for too long a period.

Current Program

Each industry has its own medical facility and one or more full-time registered graduate nurses under the direction of a full-time physician who spends a specified amount of time in the medical department of each plant.

About every six months, representatives of each company meet to discuss progress with the physician in charge of the program and to resolve any problems that may have arisen. The firms have not felt the need to form a corporation to handle the business aspects of the health program, although such action has been suggested by some experts in the field.

FINANCING. In 1946, the cost of the program was estimated at \$17 per employee per annum for companies with 300 to 800 employees. In 1951, with a total average employment of all participating plants of 3,377, the average cost per employee was \$24.45.

Each year, the industries and the physician make an agreement, a copy of which appears in the appendix as exhibit 6. Reimbursement

for service is based on a 40-hour week, the amount paid by each participating industry being determined by the percentage of time allocated to the industry and by the hazardous nature of the industry. Participating companies deposit the amount determined upon in a local bank which acts as an agent and pays the physician monthly.

MEDICAL STAFF. The present medical director, Dr. John J. Boland, is the fifth that has been associated with the program. The physician who participated in the development of the plan went to a large corporation before putting this into effect. The first medical director stayed less than a year before receiving an offer from a university interested in developing an occupational medicine teaching program. The second medical director worked a year and then went to a large rubber company. The third worked 2 years and was then persuaded to take a full-time position with a State agency in charge of employee health. The fourth worked 3 months and then went to a large chemical company.

In addition to the medical director, 14 full-time graduate professional nurses serve in the 8 cooperating plants. One plant employs three nurses, four employ two each, and three employ one each. In contrast to the physicians, there has been very little turnover among the nurses, only four of whom have resigned. All of them had been employed by the firm having the largest number of nurses.

Services are provided during usual business hours. All nurses and associated personnel are under the doctor's direction, and the physician must be consulted prior to a nurse's employment or termination.

The companies agree to respect the physician's professional status, to make no direction or requirement of him as to the method of performing services, and to provide specified facilities at the plant, including instruments and supplies that he recommends. The contract provides for employees to be referred to another physician during the absence of the medical director and for termination of the contract in the event of the physician's prolonged absence.

The doctor agrees to refer all questions of ethics to the Hartford Medical Society. An executive of each company is assigned the responsibility for all non-medical matters affecting his company that arise out of the agreement and are reported to him by the physician.

METHODS OF PROVIDING PHYSICIAN'S SERVICES. The physician visits each plant at least twice a week; his weekly hours at each plant vary from three to eight. The time schedule of his visits is posted in each health room, and the physician can be called whenever an emergency arises. If his services are needed for minor injuries and he is not in the plant, the employee is taken to him by company car.

Medical services by the physician include: pre-placement and periodic examination of all employees; termination examinations; private consultation with employees on the premises; treatment of occupational

illnesses and minor occupational injuries; laboratory services when the company furnishes the requisite facilities; advisory assistance to companies regarding safety, sanitation, nutrition, and rehabilitation of injured employees and veterans; provision of standing orders for nurses; supervision of medical aspects of job placement; evaluation of medical complaints and referral to family physician if indicated, with appointments made as soon as possible, and liaison continued with family physician after referral.

The medical director receives prompt reports on major industrial injuries. As quickly as possible, the patient is returned to the plant dispensary for follow-up examination, redressings, and rehabilitation care. Specialists on the compensation insurance carrier panels for each company are familiar with the details and objectives of the plant's medical program, and insurance carriers have cooperated by expanding their panels to include additional men where necessary.

Each medical department maintains its own confidential records. The posting is done directly to the patient's card in a visible index file, with a distinction being made between non-occupational and occupational cases. A daily statistical sheet by type of service and plant department is also kept.

PARTICIPATION OF STATE AND LOCAL HEALTH DEPARTMENTS. The Bureau of Industrial Hygiene of the Connecticut Department of Health and the Hartford Health Department have had a continuing interest in this program. They advise on the selection of personnel and give technical consultation and service on industrial hygiene matters to the cooperating industries. The State health department, as part of its work in stimulating the development of industrial health programs, tries to interest physicians in industrial health work, especially in small plant programs. It maintains a register of all interested physicians. In the Hartford program it has been instrumental in putting the industries in touch with each of their medical directors.

The location of the State health department in Hartford and the continuing interest of its bureau of industrial hygiene may account for the fact that the program is not guided by a professional advisory committee. It has been pointed out that such a committee could be of particular assistance to the medical director of a small plant cooperative health program in reconciling possible conflicting interests of the firms involved. The Hartford City Health Department's generalized nursing consultant gives nursing consultation to the nurses participating in the program.

Objectives of Plan

1. Continuous, scheduled medical service for industry, including care or supervision of employees with occupational disease and trauma, pre-placement, periodic, job transfer and retirement physical examinations, industrial hygiene services, and advice on matters related to safety,

sanitation, compensation law, communicable disease, nutrition and rehabilitation.

2. Health conservation through counselling service to employees on personal health problems; evaluation of such problems, with referral to family physician or appropriate community facility for best positive disposition.

3. Control of absenteeism for nonindustrial causes.

4. Maintenance and analysis of complete, confidential medical records.

5. Presentation and medical interpretation to management of significant statistics based on complete records.

6. Supervision of nursing services and purchase and maintenance of medical supplies and equipment.

Participating Companies

Companies originally associated with program:

COMPANY A. Type of industry: Manufacturers of socket screws, hex keys and related products.

Average employment during 1951: 595. Number of shifts: Two; 8 a.m. to 4 p.m.; 4:30 p.m. to 2 a.m.

Number of hours per week medical director spent at plant in 1951: Eight.

Number of registered nurses: Two; one on each of first two shifts. A trained first-aid worker is available during the night shift when only the maintenance crew is on duty.

Date firm became associated with the program: April 1946.

COMPANY B. Type of industry: Manufacturers of horseshoe nails, hacksaw blades, parachute hardware and tools.

Average employment during 1951: 490. Number of shifts: One. Number of hours per week medical director spent at plant in 1951: Four.

Number of registered nurses: One.

Date firm became associated with the program: April 1946.

COMPANY C. Type of industry: Manufacturers of small arms, dishwashers and bolted plastics.

Average employment during 1950: 1,518. Number of shifts: Three.

Number of registered nurses: Two; one on each of the daytime shifts. A first-aid worker is on duty during the night shift.

Date firm became associated with the program: April 1946.

Date firm separated from the program: Information not available.

Reason for separation: Plant employment exceeded maximum allowed under this part-time service; company now has a part-time physician of its own.

COMPANY D. Type of industry: Manufacturing of machine chucks.

Average employment during 1951: 351.

Number of shifts: Three. Number of hours per week medical director spent at plant in 1951: Five.

Number of registered nurses: Two; one on each shift; a first-aid worker on duty during the night shift.

Date firm became associated with the program: April 1946.

COMPANY E. Type of industry: Research and development work on glass, glassmaking equipment and clay parts.

Average employment during 1951: 506. Number of shifts: Two.

Number of hours per week medical director spent at the plant in 1951: Four.

Number of registered nurses: Three.

Date firm became associated with the program: January 1947.

COMPANY F. Type of industry: Manufacturers of coffee makers, steam irons and stoves.

Average employment during 1951: 260. Number of shifts: Two.

Number of hours per week medical director spent at plant in 1951: Three.

Number of registered nurses: One.

Date firm became associated with the program: April 1946.

Companies joining the program after its initiation:

COMPANY G. Type of industry: Manufacturers of drill chucks and arbors.

Average employment during 1951: 589. Number of shifts: Two; 7:30 a.m. to 4 p.m.; 4 p.m. to 11 p.m.

Number of hours per week medical director spent at plant in 1951: Six.

Number of registered nurses in 1951: Three; two are on duty on the 7:30 a.m. to 4 shift; one is on duty on the 4 p.m. to 11 p.m. shift. Senior nurse spends between 35-50 percent of her time as employment manager with timekeeping duties. A trained first-aid worker is on duty during the night shift when only a maintenance crew is employed.

Date firm became associated with the program: February 1948.

COMPANY H. Type of industry: Manufacturers of power transmission chains and sprockets.

Average employment during 1951: 500. Number of shifts: Two.

Number of hours per week medical director spent at plant in 1951: Ten.

Number of registered nurses 1950-51: Three; one is on duty from 8 a.m. to 5:30 p.m.; one from 3 p.m. to 11:30 p.m.; and one from 8 a.m. to 5 p.m.

Date firm became associated with the program: November 1948.

Date firm separated from the program: February 1951.

Reason for separating: Change in management.

COMPANY I. Type of industry: Manufacturers of steel castings, and jobbing. (The company is using three capsules of radioactive cobalt 60. Radiography workers have periodic examinations.)

Average employment during 1951: 225. Number of shifts: Two.

Number of hours per week medical director spent at plant in 1951: Four.

Number of registered nurses in 1951: Two.

Date firm became associated with the program: July 1948.

COMPANY J. Type of industry: Plastic rods, sheets, tubing, bottles, etc.

Average employment during 1951: 361. Number of shifts: Three.

Number of hours per week medical director spent at plant in 1951: Four.

Number of registered nurses: One.

Date firm became associated with the program: March 1951.

Values of Program

One company with 600-650 employees reported:

A reduction of 50 percent in eye cases.

A reduction of more than 50 percent between 1945 and the present in accident frequency, absenteeism, and employee turnover.

A 30-percent reduction between 1947 and 1948 in lost time from all causes, resulting in a production increase of nearly \$30,000. There was a 55-percent reduction in lost time between 1945, the year before the program started, and 1948.

Another company with 350-500 employees reported:

Consultations with the medical director on personal matters, including emotional problems, had a bearing on the uninterrupted operation of the plant; absenteeism was reduced considerably, and injured employees returned to work more promptly.

A third company with 500-600 employees reported:

A reduction of 35 percent in the frequency rates of occupational cases, but no reduction in the severity rates, between the two-year period prior to joining the health program and the first year of membership.

A reduction in the cost of physicians' services of \$1,900. In 1947, before joining the plan the company paid \$4,934 for medical services; after the company joined the plan, its share of the physician's salary plus fees to outside doctors amounted to \$3,030.

The elimination during 1948 of an estimated loss of 1,200 hours of employees' time for treatment of cases outside the plant.

Officials of the other five companies all stated that they had found the program valuable and were planning to continue their association with it; they had made no attempt to measure the value of the program in financial terms, but considered that it was most advantageous in improving employee morale.

TEACHING VALUES RECOGNIZED BY THE YALE INSTITUTE OF OCCUPATIONAL MEDICINE AND HYGIENE. The teaching possibilities inherent in the Hartford program were recognized soon after it was established. Dr. Buchan, its first medical director, transferred to the Institute as

clinical director; Dr. Robert Quimby, its third medical director, served on the Institute's staff while with the program. According to Dr. Quimby, the educational advantages of a small plant health program to university centers of medicine and nursing are yet untapped. The diversity of environmental factors found in a group of small plants demonstrates the relation of the occupation to man's health as well as the importance of incorporating both preventive and curative medicine in industrial medical practice. Dr. Quimby visualizes the possibility of using small plant programs as training centers for physicians and nurses taking special courses in industrial health, with close contact being maintained between the small plant program, the university, and State and local industrial hygiene agencies.

CASE FINDING AND REFERRAL. The medical directors have reported that case finding and referral has been one of the outstanding values of the program. Each month a significant number of patients are sent to family physicians or community agencies, and the patient is urged by the industrial physician and nurse to follow through with treatment. Liaison is maintained with the family physician, thus adding to the professional satisfaction of the industrial physician and increasing the awareness of industrial health problems by the family physician.

Patients with serious diseases found and placed under treatment in 1951 included: two with heart disease, two with diabetes, four with hernia, one with kidney disease, two with gastro-intestinal disturbances, one with cancer, one with neuro-mental condition, one with severe anemia, five with back injuries, and three with tuberculosis.

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Community Programs

The Philadelphia Health Council Program, Philadelphia, Pa.

Covering an 8-year period, this demonstration program began in 1924. Thirty-one firms, employing from 25 to 560 workers, with an average total employment of 9,721, participated in the experiment.

The program was established and directed by the Philadelphia Health Council and Tuberculosis Committee (referred to hereafter as the Council) to (a) benefit the health of workers and discover cases of tuberculosis in their early stages, (b) interest the employer and employee in health work and in better working conditions, and (c) prepare the way for a permanent medical service in small plants by combining several plants in a unit service under the supervision of the plants themselves.

As a basis for this program the Council, in 1924, made a survey to determine how many plants in Philadelphia had medical service and the general extent and character of such service where it existed. It found an organized medical service in 76 out of 193 concerns having more than 300 employees, and in only 5 out of 680 smaller plants, each of them a subsidiary of a large concern.

The survey revealed that a sizeable number of plants were interested in helping to maintain the health of their employees and were willing to consider an in-plant medical service.

The 31 industries that participated in the Council's plan represented many types of business, including 11 confectioners, 2 cake bakers, 2 pork packers, 1 root beer manufacturer, 3 lithographers and printers, 2 woolen yarn or woolen knitting mills, 1 silk mill, 1 narrow tape mill, 1 suit manufacturer, 1 elastic goods mill, 1 iron and steel mill, 1 lead and alloy foundry, 1 cigarette factory, 1 paper bag maker, 1 paper box maker, and 1 calf skin tannery.

The Program in Operation

The Council employed a full-time industrial secretary to elicit the interest of employers in the advantages of in-plant health services, and a full-time medical secretary, Dr. William J. McConnell, who, with two part-time physicians, supervised the over-all program and set up the medical service in the plants. After accepting a position as medical director of one of the larger firms, Dr. McConnell was retained as consultant, and Dr. Glenn S. Everts, his assistant, took over the work.

The first step was to get the consent of management for health talks and health examinations to be made on the company's time. A series

of six posters were then placed throughout the plant at intervals of from two to three days to gain the interest of the employees. Later a short talk on general health matters, with special emphasis on the value of health examinations, was given by a physician or nurse. A definite date was set for the examination, and a physician, a nurse, and a stenographer were sent to the plant at the appointed time. Each examination required approximately thirty minutes, fifteen for the interview by the nurse and for recording the employee's medical and social history, and fifteen for the examination by the physician.

The examinations were voluntary, and an average of 60 to 70 percent of the employees at the various plants accepted the service. In some cases everyone, including the employer, was examined. The information was confidential, but the employer received a summary report in which the employees were classified into four groups—those in excellent health, and those in good, fair, and poor physical condition. In the course of each examination the employee was referred to his private physician if care was needed. All cases in which defects were found were followed up, either by letter, by a nurse's visit, or by physician's consultation; the method depending upon the seriousness of the defects and the apparent requirements of the individual. In more serious cases, such as heart and lung conditions, if the employee had no physician and could not afford one, he was referred to a city clinic where the needed treatment was provided. When working conditions were found to be detrimental to the health of an employee, the permission of the individual was obtained to take the matter up with his employer, and an effort was made to assign the employee to work which he could perform safely.

Of the first 400 individuals examined, less than 9 percent were graded as in excellent health. Of the remainder, 55 percent had defects of the eyes; 23 percent, of the nose; 18 percent, of the throat and tonsils; 39 percent, of the ears; and 56 percent, of the teeth. Tuberculosis was found in 3.1 percent of the examinations, and heart defects, in 7 percent.

In addition to health examinations of employees, the Council offered to have a sanitary engineer make a complete survey of health and accident hazards at the plant. Dr. McConnell reported that many plant managers believed that their employees were all healthy and that their plants were examples of the best to be found. Many welcomed the examinations and survey in order to prove their contention, but they were seldom able to do so. He stated that the result of the survey with the grading of employees was usually a shock to management.

The final step in the Council's program was to group small plants in the same locality into units of approximately 1,000 employees. Each plant participating in the unit service provided its own first-aid or clinic room with necessary equipment. The medical and nursing service, first-aid instruction, and sanitary supervision were provided by the Council. The program, however, was considered by the Council to

be a demonstration; and when a unit was sufficiently organized and capable of continuing the service, it was turned over for further administration to a committee of the cooperating plants, and supervision was relinquished completely by the Council and the Tuberculosis Association.

In 1932, after the unit plan had been in operation for 8 years, the Council discontinued the demonstration. Arrangements were made for each plant to be served part time by a physician and by a member of the Visiting Nurse Society of Philadelphia.

SERVICES PROVIDED UNDER THE ORIGINAL PROGRAM. In general, services provided at each plant were as follows:

1. Examination of employees at inauguration of program.
2. Pre-placement physical examination for all new employees.
3. Periodic examination annually for all employees.
4. Care of accident cases by plant physician or nurse whenever available or, in their absence, by trained first-aider, with prompt report to plant physician. Redressings for all accident cases were provided at the plant if the individual was on the job or if he could travel back and forth to the plant dispensary. Serious accidents were cared for at a nearby hospital in accordance with an arrangement for such service. In the absence of the physician or nurse all eye accident cases were sent to an eye specialist.
5. Emergency care of nonindustrial illness while employee is at work, with referral to family physician when patient is too sick to work.
6. Diagnosis of chronic pathological conditions, explanation of the findings to employee, and referral to family doctor or diagnostic clinic when necessary.
7. Follow-up visits to dispensary after the original physical examinations.
8. Home or hospital visits to injured or sick employees in the capacity of a friend, never professionally, to estimate probable date of return to work for benefit of the foreman of the department involved.
9. Health education in the form of talks, posters on bulletin boards, and pamphlets given to employees by physician or nurse.
10. Sanitary survey of plant annually and frequent inspections throughout the year with particular reference to occupational hazards.
11. Accident prevention through cooperation with the safety program: getting an accurate report of the accident from the injured employee, and following up the mechanical factor at fault to see that the accident does not recur.

An educational effort undertaken when each medical department was opened was said to add much to the success of the medical program. Foremen and superintendents were contacted and the purpose of the department was explained to them. A bulletin board was installed, on which were posted a notice of the opening of the dispen-

sary, the dispensary schedule, and directions regarding proper procedure in case of accidents. Different health posters and accident posters were also placed on the board each month. The physician and nurse made a trip through the plant, checked on the location of first-aid boxes and on their equipment, and selected workers for first-aid training. Arrangements were made for all absences of two days or more to be reported to the medical department. At the earliest opportunity, the medical director of each plant visited the claims agent for the plant's compensation insurance carrier, explained the program, and established a satisfactory working relationship with him.

In-plant medical services in several plants were supplemented by a loan fund through which employees could finance certain needed medical services.

MEDICAL PERSONNEL AND VISITING NURSE SERVICE. Nineteen physicians and twenty-two nurses provided services for varying periods of time between 1924 and 1932, the date the demonstration ended.

Under the later arrangements, whereby nursing service was and still is provided by the Visiting Nurse Society, each plant had its own nurse assigned to it. The amount of nursing service remained, in many instances, the same as under the unit plan; namely, two hours of nursing and one hour of physician's time per week per 100 employees. Visiting nurse service is still being provided to some of the original plants, and it has also been extended to a few other small plants.

At the beginning of 1952, six plants, with a total of 2,065 employees, were receiving a total of 58.5 hours of nursing service and 17.5 hours of physician's service per week. One foundry with 360 employees receives 13 nursing hours per week, and a metal furniture manufacturing company with 450 employees receives 15 hours per week. The physician is at each of these plants 1 hour per week. In the remaining plants the nursing service per 100 employees ranges from $1\frac{1}{4}$ to 5 hours per week. The time the physician spends in these plants per 100 employees ranges from about half an hour to $2\frac{1}{4}$ hours per week.

In order to insure as much professional coverage as possible, part of the nursing time is scheduled during the hours when the physician is not at the plant. However, the nurse and the physician work together at the plant for at least one hour each week so that they can discuss their mutual problems. The nurse tries to give consecutive hours rather than two appointments a day to a plant. Miss Ruth W. Hubbard, director of the Visiting Nurse Society, observes that the particular period of the day that a nurse is in the plant is almost as important as the total number of hours she gives, and that the hours must be scheduled for the convenience of the employees and so as not to curtail production.

After the Visiting Nurse Society agreed to provide nursing service in the plants, a member of its supervisory group was assigned to act as liaison between the society, and the plant physician and manage-

ment. This supervisor also is responsible for the daily progress of the work in each plant. She assists in the selection of plant nurses and in their introduction to the plant routine, and she is responsible for their continuous staff education. During the early phases of the program, one or more members of the Visiting Nurse Society staff held monthly meetings with the plant physician, the industrial nurses and their supervisors at the society's office. Miss Hubbard stated that much of the work of standardizing dispensary procedures, establishing standing orders and plant policies, and developing new programs had been carried out in these conferences.

While on duty at the plant, the visiting nurse is a regular member of the plant personnel. Her knowledge of community health resources is particularly valuable in assisting the employee to carry out the recommendations made at the time of the annual health examinations and in arranging for medical and nursing attention at home, convalescent care, hospital care, temporary child placement, or recreational opportunities. Likewise, she is in a position to refer to appropriate community agencies the employee who may have difficulty in meeting his medical expenses.

Whenever possible, a new nurse, whether she is to give care regularly or to serve as a relief nurse, has a planned orientation course, including observation in several plants. The industrial nursing consultant works with the nurse in the plant for the first week. After her indoctrination period, the relief nurse visits the plant regularly in order to become known by the employees and to become familiar with the daily activities of the plant. It has been demonstrated that these visits are vital to successful relief duty.

FINANCING. Program costs varied according to type and size of industry. Each industry financed the installation of its own medical department. Under the unit system, the companies paid the Council \$4.50 per employee per year; later, the plants made their own arrangements with physicians in private practice and with the Visiting Nurse Society of Philadelphia. In 1939, Dr. Everts estimated that, exclusive of the cost of setting up the dispensary, minimal services cost about \$10 a week in a plant with 100 employees. This figure included 1 hour of physician's service at \$4 and 2 hours of nursing service at \$1.25 per hour. The original cost of constructing a 2-room dispensary, including sink, electrical fixtures and outlets, to serve 100 employees was said to range from \$50 to \$500. In each instance, the space was walled off to create a room, which was then subdivided into a larger general treatment room and a smaller examining room. The firms were urged to draw the plans to scale and in sufficient detail, showing the desired location of the dividing partition, the sink, the lights and the electrical outlets. [Today professional and material costs are much higher.]

Original cost of equipping the dispensary with furniture and instru-

ments was estimated at \$150 and the cost of original supplies, at \$75. Dr. Everts has stated that, although there have been improvements in equipment, he has found that requirements remain essentially unchanged because of lack of time to make the fullest use of the finer equipment for diagnosis and physical therapy.

Extent of the Program

By 1932, when the demonstration project was discontinued, the 31 medical departments established under it had been closely integrated with general plant routine. In 1939, 13 of the programs were still functioning. These 13 plants kept their medical departments intact during the entire depression period, and it is very probable that during a less trying financial period, a much larger number of medical departments would have been continued. Nine industries had discontinued their programs for financial reasons, four had moved from the city, and for five industries the reason for discontinuance was not known.

Value of the Program

One plant, with an average of 100 employees and with a dispensary that has been operating since 1926, has had less than five lost-time accidents per year. One of the services which executives at this plant most appreciate is the check which the physician makes on the progress of employees who are absent because of illness, especially those who have had long service with the company. This plant has always been particularly interested in its older employees, and most of them have taken advantage of the periodic physical examinations that are available under the program.

Another plant, with 225 employees and a dispensary that has been operating since 1931, averages less than 9 lost-time accidents per year. Executives at this plant frequently visit the dispensary for preventive medical care. They have found the medical department to have a stabilizing influence on employee morale.

A third plant, with an average of 500 employees, began its program in 1930, after a series of 11 interviews in which executives frankly questioned the value of such a program. Once the program was established, however, its value was readily recognized. By 1944, the dispensary had already been remodeled four times, and no single request for equipment had been denied. The program had begun with the services of a nurse and a physician, both on a part-time basis. At the end of the first year, the industry employed a full-time nurse. Although the plant averaged less than 20 lost-time accidents per year, executives had observed that in the absence of the nurse considerable time was lost by curious and would-be helpful employees whenever an accident occurred. Executives at this plant are wholeheartedly in favor of pre-placement examinations and of health services, especially for older workers.

Specific values resulted from knowledge on the part of the nurses and

physician of plant procedures and the tempo of the work in various sections of the plant. For example, in one plant, monthly reports showed that a group of young women in a packing department had an unusually high incidence of gastro-intestinal difficulties. Studies of their work, their lunch period, and their choice of foods in the plant cafeteria resulted in some menu changes and the institution of relief periods. Conferences on food selection and normal diet were arranged among the nutrition consultant of the Visiting Nurse Society, the nurse, and the girls in this department, and a diminution of the symptoms followed.

An experience of Dr. McConnell, now director of the Industrial Health Bureau of the Metropolitan Life Insurance Co., during his association with the program in its early years, demonstrates the value of pre-placement examinations and their use in proper placement. A job applicant examined by Dr. McConnell feared he would be rejected because of a physical disability. The doctor, however, persuaded management that the disability would in no way interfere with the man's work and he was hired. This employee is now an official of the plant and a strong advocate of in-plant health services.

According to Dr. Everts, the plant executives found that their health programs saved them money. In his opinion, however, they appreciated the availability of in-plant medical personnel for referral of borderline health problems and cases involving mental and emotional disturbances even more than the prompt treatment of accidents and the quality and volume of routine services provided.

In speaking recently at a meeting of the Industrial Relations Association of Philadelphia, Dr. Everts said that, as indicated by the experience in these plants, industry is gradually recognizing the economic sense of taking just as good care of its employees as it does of its machines by providing care not only for accidents and illnesses for which the employer is lawfully liable, but also for sickness which is not covered by law. Why shouldn't the employee, especially the executive, be expected to assume the responsibility of taking care of his own health and paying for it out of his own pocket? The answer, according to Dr. Everts, is that he should—but he doesn't. The absenteeism rate proves it; the too early deaths of executives prove it. "Industry, therefore, is accepting the idea of having to give considerable help and encouragement in looking after the health of its entire working family whether its political philosophy of bearing that burden leans that way or not. In the long run it is the cheaper way."

In reviewing the accomplishments of this project, Dr. Everts stated that it demonstrated the necessity for helping the average private practitioner to learn more about the practice of industrial medicine and thereby to increase his interest in small plant work. In Dr. Everts' opinion, the local medical society is the appropriate group to point the way toward adequate medical service in small plants. A program of

this type undertaken in 1943 by the Committee on Industrial Health of the Philadelphia County Medical Society in cooperation with the Health Committee of the Chamber of Commerce and Board of Trade of Philadelphia is described in the section, "The Philadelphia Medical Society—Chamber of Commerce Small Plant Program."

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The New Haven Industrial Medical Service, New Haven, Conn.

The New Haven Industrial Medical Service was established in May 1942 in three plants in New Haven County. Originally, between 500 and 600 workers were served, the number in each plant ranging from 50 to 400.

Realizing that industrial medicine and hygiene still had many unanswered problems, especially regarding small plant programs, the Section of Preventive Medicine of the Yale University School of Medicine decided to sponsor a small plant medical service. During the experimental period, estimated at approximately 2 years, the service

was to be limited to five plants. The program was then to be reviewed, to determine whether it was worthwhile and should be extended to other plants.

For more than a year before the service began to function, two of the men primarily responsible for its development, Professor John R. Paul of the Yale School of Medicine and Dr. Albert S. Gray, then director of the Bureau of Industrial Hygiene, Connecticut State Department of Health, discussed it with representatives of various interested organizations, including the local medical society, industry, and insurance companies, and with public health and workmen's compensation officials. Later, the program's first medical director, Dr. Louis G. Welt, stated that disregard of organized labor was perhaps one of the greatest errors that had been made in connection with the plan. "This group," he said, "is vitally concerned with such programs and should certainly be consulted. Moreover, they could play a very large part in an educational program aimed at enlightening the community in regard to these problems."

A Committee on Industrial Health, representing the New Haven Medical Association, assisted in developing the program and maintained an active interest during the entire time it was in operation, handling all complaints and reviewing any proposed changes in the program.

The proposed functions were as follows:

1. To serve as a demonstration that adequate medical service for small plants is possible.
2. To act in a consultative capacity to plants in determining the nature of actual or potential hazards (such as those arising from the introduction of new materials or factory methods) and to advise as to their prevention and control. This assistance was to complement rather than to supplement the services available to industry from the Bureau of Industrial Hygiene of the State Department of Health.
3. To initiate, whenever advisable, various programs of disease prevention in the plants. This did not include the provision of medical care, which remained in the hands of the family physician.
4. To arrange for pre-placement and periodic physical examinations to be given by local physicians.
5. To carry on research on health problems in various types of industries and to use the data to help decrease the incidence of disease.

The Program in Operation

The program was directed by the Section of Preventive Medicine of the Yale University School of Medicine. As a result, the services of a corps of specialists in medicine, surgery, industrial chemistry, and engineering were available for consultation purposes. No central clinics was established, but periodic reports and other essential information were sent to the school of medicine for analysis.

Three plants participated in the program: A manufacturer of vitrified grinding wheels in West Haven, a manufacturer of engine parts in Hamden, and a phonograph and dictaphone plant in New Haven. Plant dispensaries were set up in each of these plants and were maintained under the direction of an industrial physician, an industrial nurse, and one or more first-aid assistants. Employees were notified regarding the hours the nurse would be in the dispensary, and "sick-call" was held each day.

Personnel associated with the program have pointed out that the distances between the plants required the physician and the nurse to spend considerable time in travel, thereby decreasing the efficiency of the service.

PERSONNEL. According to the original plan, a full-time member of the university staff was supposed to serve as medical director of the program, but Dr. Louis G. Welt, who had been appointed to this position, left for military service a few months after the plan began to function. Dr. Maurice M. Hillman, an industrial physician practicing part time in New Haven, succeeded him. Dr. Hillman visited each plant at least once a week and remained with the program until it was terminated.

Nursing service was provided by the New Haven Visiting Nurse Association. One nurse with the occasional assistance of a substitute nurse usually served the three plants, spending about 1½ hours a day in each plant. Local medical authorities highly praised both the support which Miss Elizabeth Fox, director of the New Haven Visiting Nurse Association, gave to the program and the ability of the nurses who were carefully chosen for this particular work.

A secretary or accountant handled the administrative details of the whole program.

SERVICES PROVIDED. All occupational illnesses and injuries requiring more care than could be provided by the physician or nurse in the dispensary were referred to an outside physician immediately. Usually, these cases were served by a physician on the panel list of the appropriate insurance company.

All nonindustrial injuries and illnesses requiring a physician's care were referred to physicians in private practice. At the family physician's request, such services as insulin injections were provided at the plant.

In accordance with the agreement with the New Haven Medical Association, pre-placement physical examination, which included a urinalysis and Wasserman test, were performed by a local physician chosen by the plant and paid on a fee-for-service basis. The findings were made available to the medical service and were used as a basis for placing prospective employees in suitable positions.

Policy regarding periodic examinations varied in the three plants, but employees over 55 years of age were usually examined annually.

Return-to-work physical examinations were also frequently performed. Like the pre-employment physical examinations, these examinations were also performed by local physicians and paid for on a fee-for-service basis.

Health education activities included, among other items, instruction regarding oil dermatitis, the commonest industrial health hazard in the plants. The nurse provided health counselling on medical or other problems in the employee's family or home environment.

As an active member of the safety committee, the nurse gave first-aid courses to chosen employees and participated in other safety programs.

Voluntary X-rays were done in all plants in May 1943, covering 476 out of 570 employees. Plans were made with the State Tuberculosis Commission to repeat these examinations annually.

HEALTH RECORDS. Since the university's major reason for establishing the service was to explore some of the problems involved in organizing and directing small plant medical programs and to determine whether or not new medical information might be obtained from them, special attention was given to developing the record system. Dr. William M. Gafafer, principal statistician, Division of Industrial Hygiene, U. S. Public Health Service, worked with members of the university staff in devising the record system put into operation in each dispensary.

In addition to a detailed record of visits to the dispensary, the nurse kept a strict account of time lost because of industrial accidents, illnesses, and other reasons. In many instances she personally interviewed the absent employee upon his return to work.

A detailed analysis of the records for two of the plants was published in *Occupational Medicine*, January 1948.

VISITS TO THE MEDICAL DEPARTMENT AND ABSENTEEISM. An analysis of records showed the following visits per employee to dispensaries in two of the plants during 1944 and 1945:

Type of visit	Average annual number of visits per employee			
	Plant A		Plant B	
	1944	1945	1944	1945
All visits	7.0	10.0	18.5	18.5
Surgical	3.0	5.0	10.7	10.5
Initial	2.5	3.5	7.7	7.5
Revisits	.5	1.5	3.0	3.0
Medical	4.0	5.0	7.8	8.0
Initial	3.5	4.0	5.5	6.0
Revisits	.5	1.0	2.3	2.0

The higher rate in visits for surgical care at Plant B over Plant A presumably was due, in large part, to the hazards inherent in working

with heavy machinery. A considerable increase in the number of employees at Plant A during the two years undoubtedly accounted for the higher rate of surgical visits at that plant during 1945 as compared with 1944. New and inexperienced employees have a tendency to suffer more frequent injuries than experienced workers.

There was no truly hazardous work in either plant. In one, the possibility of exposure to chlorinated hydrocarbons was present, but the hazard was fairly well controlled. In both plants, good safety programs had been established, with regularly scheduled safety meetings.

A table giving the annual rates of absenteeism in both plants for the two-year period, which is published in the appendix on page 149, shows the predominance of absences due to sickness and nonindustrial injuries. During the two-year period, no absence because of occupational disease was reported, although several persons with industrial dermatitis were treated in the plant dispensaries. Industrial injuries also played a very minor role in absenteeism, indicating that the visits to the dispensary for surgical reasons were almost entirely for non-disabling causes.

An attempt to break down sickness by type of illness showed that, even where rather complete absentee records are maintained, a satisfactory evaluation of sick absenteeism is difficult because explanations given by the employees are often nonspecific as to illness. This presents a major problem in carrying out studies in industrial populations and is the principal reason that many published studies deal with absences of eight calendar days or longer for which medical certificates have been obtained. In New Haven, absences of a half-day or longer were recorded.

Analysis of these records strongly suggested the practicability of utilizing small plant populations for a fairly intensive study of illness.

FINANCING. The Section of Preventive Medicine of the Yale University School of Medicine and the New Haven Foundation both contributed funds to assist in inaugurating medical service. For a preliminary period, each plant contributed \$2 per employee per year, as a token payment. In April 1944, after 18 months of experience, the rate was set at \$6.50 per employee in plants with less than 150 employees and at \$6 for larger plants. If the cost of pre-placement examinations and the services provided by the university are added, the per capita cost would have been nearer \$12 or \$13. The extension of the program to five plants, as originally planned, would have reduced the per capita cost.

Evaluation of the Program

In March 1946, a report on the first 3½ years' experience under the program appeared in the *Connecticut State Medical Journal*. The program was said to have proved that this type of industrial medical service is possible and has many potentialities, and that while a

service of this kind could not be compared with well-organized services in large industries, it was well worth its cost. In spite of many difficulties, primarily due to the war period, the *Journal* reported the following accomplishments:

The medical service had worked closely with the local medical society and had raised the level of industrial hygiene in all plants. About a year had been required to get the program working efficiently in each plant, and patience and tolerance had been necessary during that time.

Pre-placement physical examinations for each plant had been greatly improved. Prior to the program's establishment, the examinations had been performed in a rather haphazard manner in some instances.

Oil dermatitis, the commonest industrial hazard in the plants, had been practically eliminated through a health education program.

Absenteeism had been reduced steadily since the start of the program. This reduction had been accomplished through the concerted efforts of a number of individuals and agencies, including the plant management, the insurance company's safety engineer, and the plant physician and nurse. As a result, production had increased and insurance rates had decreased.

Lack of published data on sickness absenteeism among workers in small plants made the analysis of plant medical records especially valuable. This information has proved useful to personnel managers in local plants. A particular comment was made regarding the assistance in recording absenteeism that can be provided by a nurse, especially in small plants without a highly developed personnel department.

Persons who were closely associated with the program have recently described it as a fine but rather expensive experiment, with its discontinuation due primarily to the lack of a physician with sufficient time to devote to it, and other circumstances associated with the war.

Present Status of the Plant Programs

Dr. J. W. Meigs, assistant professor of occupational medicine in the Department of Health, Yale University School of Medicine, one of the physicians who has studied this program with particular interest, described its present status as follows:

The health service for the plant with only 50 employees was not particularly successful and was discontinued after about two years.

The service in the company with about 400 employees was only moderately successful and was stopped after about 3½ years of operation. The management in this plant was not convinced that the service had been of sufficient benefit to warrant its continuation.

Service in the company with about 200 employees still operates. This program was successful largely because the management had a real interest and an understanding of the values of an in-plant health program.

Recommendations Regarding Similar Programs

Dr. Meigs stated recently that small plants participating in a cooperative health program should form an inter-plant health committee to adjust minor inter-plant problems, educate new cooperating plants, and maintain continuity of interest and action. In discussing the New Haven Industrial Medical Service, he said that if an occupational health service is to achieve professional success, there must be provision for maintaining and improving professional standards. The Yale University School of Medicine, which originally had intended to supervise the program, was not able to do so under the wartime conditions that prevailed. Furthermore, according to Dr. Meigs, trained personnel were not available to carry out on-the-job teaching programs in the New Haven plants.

The article in the *Connecticut Medical Journal* stated that plants with less than 50 employees do not fit into such a cooperative health program; the efficient maintenance of a dispensary, an absentee record system, and some of the other features of health programs in plants with 100 or more employees are difficult for plants having 50 employees or less. The desirability was also pointed out of limiting the participating plants to those located near each other to avoid loss of travel time by physician and nurse.

The article further commented on the fact that, while the university has sponsored the program, the project was regarded more as a community project, and that a similar service could be sponsored by various other agencies interested in local health and industry. It was conceded that such a program may have a better chance of surviving if it has university backing, and that, moreover, if a full-time industrial physician is employed, he may be able to derive some of his salary from a teaching and research position at the medical school. However, it was pointed out that other agencies could effectively sponsor such a program. It was stated that agencies which might naturally interest themselves in a program of this type were: (1) The local health department or a special industrial division of this department, (2) a health committee of the chamber of commerce, (3) local manufacturing societies, and (4) an independent manufacturers' organization.

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The Williamsport Industrial Health Program, Williamsport, Lycoming County, Pa.

This community-wide program was initiated in September 1942 to promote health programs among the 150 industries, with approximately 20,000 employees, in Lycoming County.

The program is the direct result of efforts by local industry and the medical profession to increase manpower efficiency during World War II. It grew steadily during the war period under the direction of an Industrial Health Conservation Committee, established through the joint efforts of the Community Trade Association (the Chamber of Commerce of Williamsport) and the Lycoming County Medical Society. Representatives of both organizations, as well as prominent industrialists, city and county health officers, dentists, educators, and employee representatives, served on the Committee. Dr. John P. Harley, cochairman of the Pennsylvania Industrial Health Commission, served as chairman.

In describing the purposes of the program, Mr. W. Van Person, then president of the Williamsport Community Trade Association, stated: "The war has taught us all that the physical well-being of all our people is of primary importance. Since industry reaches out into almost every home through its employment of labor, it seems imperative that the health of our industrial employees should be emphasized through well-organized community action. It is our hope that industry will agree that physical fitness is a prime requisite to greater happiness and enhanced production and will cooperate in our long-range program. Our final objective is adequate medical service for every industrial and mercantile employee in Lycoming County."

As its first step, the Committee requested the Bureau of Industrial Hygiene of the Pennsylvania Department of Health to make a survey of Lycoming County industries, from the standpoint of the physical environment and existing health services. The results showed that 57 percent of the 97 surveyed plants had 50 employees or less, while only 9 percent had more than 300 workers. In-plant health programs were in operation in only the three largest plants surveyed; 18 plants provided pre-employment, and 12 provided periodic, physical examinations.

The Committee immediately set about developing a plan for demonstrating to industries the value of good health services and for assisting

them in establishing in-plant programs. Dr. Joseph Shilen, director, Bureau of Industrial Hygiene, Pennsylvania Department of Health; Dr. Charles-Francis Long, chairman of the Industrial Health Commission of the Pennsylvania State Medical Society; and Dr. Orlen J. Johnson of the Industrial Health Council of the American Medical Association assisted in formulating the plan which the Committee finally adopted.

Soon after it was formed, the Committee established as its objective the development of health units in industry and the promotion of voluntary group health insurance as a means of (1) reducing absenteeism, (2) rehabilitating and properly placing war veterans and other physically handicapped persons, and (3) increasing productive manpower through the re-evaluation of retirement policies covering persons past 60.

The Promotion of the Program

To interest the community in the program, all types of publicity were used, including the designation of Community Health Conservation Week through a proclamation by the Mayor, public meetings, personal letters to manufacturers, and the distribution of various types of health literature.

To facilitate the establishment of in-plant health services, the presidents of the medical society and the trade association sent each industrial manager a joint letter, including a list of available industrial physicians, suggestions for medical service quarters, a list of essential equipment, and suggestions for a communication to employees outlining the medical service procedures. The letter also outlined the probable expense of setting up a medical service and indicated its financial and human benefits.

Follow-up informational letters dealt with specific health problems, such as tuberculosis and venereal disease control, nutrition, veteran rehabilitation, nursing service, and health education. Each letter contained a pamphlet dealing with the subject discussed.

A 19-page pamphlet, published jointly by the County Medical Society and the Committee of the Trade Association in August 1944, described the progress that had been made to date. It included statements by several industries in the community evaluating the benefits derived from their medical programs and letters from the presidents of the two sponsoring organizations. Copies of these and other promotional letters appear in the appendix as exhibit 7. This pamphlet, *Williamsport Industrial Health Plan*, proved so effective in encouraging other industries to install programs that a second edition was published in 1947. Later, beginning in March, 1948, the publication of a newsletter, *Industrial Health Bulletin*, provided valuable information on various phases of industrial health.

Members of the Committee made personal visits to industries to

explain to plant managers the purpose of the program. Dr. Harley and one of his associates on the Committee visited at least one plant a week for a period of over a year. The Health Advisory Committee of the U. S. Chamber of Commerce assisted in promoting the program by writing to industries, describing the economic and social benefits which in-plant medical services had brought to many thousands of plants and their employees throughout the country. The Williamsport Committee was hampered in obtaining coverage of large groups of employees since eight of the ten largest plants in the country were owned by outside companies, which meant that decisions on in-plant medical programs often had to be made in cities some distance away.

Through industrial health conferences, the work being done in Williamsport has been closely allied with that of other industrial groups throughout Pennsylvania as well as national groups. For example, an Industrial Health Conference for Central Pennsylvania held in Williamsport on April 23, 1947, stimulated considerable local interest. The all-day meeting was attended by physicians, business leaders, industrial nurses, and representatives of labor and of the Bureau of Industrial Hygiene of the Pennsylvania Department of Health. Formal papers were presented during the morning, and the entire afternoon was devoted to a discussion in which the audience participated.

A model dispensary with all necessary equipment was set up, as well as an exhibit that demonstrated the services available without charge to any plant in the State from the Bureau of Industrial Hygiene. A list of industrial hygiene services provided by the Bureau, included in the *Industrial Health Bulletin*, is reproduced in the appendix on page 203.

As recommended by the Industrial Health Conservation Committee, the in-plant health services in Lycoming County have been integrated with community health programs and have been greatly strengthened thereby. For example, in August 1944, the Lycoming County Tuberculosis Society inaugurated a chest X-ray program in industry, and positive detections were found among seven percent of the first 20,000 persons X-rayed. Two years after the start of the case-finding program, chest X-rays had been taken of over 85 percent of all factory workers, a record which Mr. Noyes, the manager of the Community Trade Association, considers "not only a success but a triumph." During this period, the X-rays were taken at the plant if there were more than 100 employees, otherwise they were taken at the YMCA or YWCA. In 1949 the Society purchased its own X-ray equipment and installed it at the Williamsport Hospital. Some of the work is now done at the hospital and the balance at the individual plants. The cost is about \$1 per employee. When the X-ray picture is taken at the plant, only about ten minutes of the employee's time is used.

The development of nutrition programs was given a high priority early in the program, and the assistance of various community groups was enlisted. For example, in 1943, plants employing approximately

8,500 people participated in Health for Victory Club programs, sponsored by the Westinghouse Company and staged in the local high school auditorium. A dietitian, supplied by the Pennsylvania Light Company, demonstrated the proper preparation of foods and emphasized the importance of a balanced diet.

Monthly meetings for the discussion of sound nutrition practices were held, and thousands of monthly meal-planning guides were distributed. The meetings attracted large numbers of workers' wives, and helped sustain the interest of the plant cafeterias which had assisted in promoting the nutrition program.

The problem of the disabled veteran—the need for his rehabilitation and placement in a job that he could fill—was called to the attention of employers. The medical aspects of this placement were considered by the physician serving industry. The Williamsport Technical Institute worked closely with industries in an effort to rehabilitate handicapped workers and to provide safety instructions to foremen and supervisors. It further served industry by analyzing the capacities of job applicants and matching them to the physical and mental requirements of various jobs.

The basic content of the recommended in-plant program is indicated in the following duties of a physician rendering in-plant health services, as outlined by the Industrial Health Committee of the Lycoming County Medical Society:

A physician shall be engaged to spend a stipulated amount of time in the plant. His duties shall be:

- (a) Supervise sanitation and working conditions and become acquainted with requirements of operations and processes.
- (b) Pre-placement and periodic physical examinations.
- (c) Health consultation and education of workers—individually and as a group.
- (d) Treatment of minor injuries occurring while he is in the plant.
- (e) Supervise the keeping of adequate and accurate records of absenteeism. Consideration of the results, to improve the health of the worker.

The amount of time to be spent in the plant at definite periods to be determined by management and the physician. The following minimum is suggested: 1 hour a week per 100 workers (or less). As the service develops, it will unquestionably need to be increased.

To assist in selecting a physician, a list of members of the Lycoming County Medical Society willing to cooperate will be drawn up. A plan of rotating these physicians among the participating plants will be made or each plant may arrange for a certain physician to render the service permanently.

In addition to recommending that the physician spend a specified amount of time in the plant each week, the Committee stated that the employment of an industrial nurse in the plant to carry out the physician's orders and to keep records was fundamental to a good in-plant health program. In addition to pre-employment physical examinations and other services necessary for proper job placement, health counseling, preventive services, health education, and nutrition programs were

also advocated as essential parts of the plan. The coordination of in-plant health services with community health programs was repeatedly urged. For the proper administration of such programs, according to the Committee, the plant physician and the plant superintendent should have the same administrative relationship to top management, and adequate confidential health reports of all employees should be maintained as a basis of a successful program.

The In-plant Programs in Operation

MEDICAL PERSONNEL. Each industry arranged its own program and employed its own doctor and nurse. In 1947, at the peak of the program development, 15 physicians provided services in plants in Williamsport and Lycoming County, 1 on a full-time basis, 5 on a part-time basis, and 9 serving on call. In the same year, approximately 25 industrial nurses were serving industries in the area. During 1951, industries in Lycoming County were served by the same number of physicians and by 20 industrial nurses.

To help provide specialized training in occupational health, the Committee, in cooperation with the Williamsport Technical Institute, in 1947 sponsored a course for industrial nurses. A series of lectures, given one night a week for ten weeks, was attended by 50 nurses, who received certificates upon completing the course. The interest of public health nurses in industrial work is emphasized by the fact that some of those attending the course came from as far as Wellsboro, a distance of over 50 miles, and some from Sunbury, which is 30 miles from Williamsport.

FINANCING. The cost of establishing a medical department varied, depending on the number of employees and the extent of the services to be provided. Small plants paid about \$500 to establish and equip a one-room first-aid setup, and the larger plants paid well over \$1,000 for more elaborate facilities. The cost of maintaining the plant medical departments is not available.

Physicians are paid on an hourly or a contract basis. In 1947 the average hourly rate was \$7.50; it is the same today. Nurses' salaries in 1947 varied from \$150 to \$175 per month; at present the average salary is \$180.

Extent of In-plant Programs

In 1942, when the program was inaugurated, the industries with the ten largest payrolls in Williamsport employed almost 50 percent of the employees in the city. The only in-plant medical departments in existence at that time were in the three largest plants.

Two years after the initiation of the program, eleven of the larger companies, employing 8,722 people, had health units set up to give reasonably complete service, and 61 plants, employing 11,500, had some degree of medical service.

In 1947, when the Committee work was at its height, about 12 com-

panies in Williamsport and Lycoming County, with a total plant population of approximately 9,000, had in-plant medical programs providing some form of medical care. In 1950, approximately 70 percent of the 20,000 employees in the 150 plants in Lycoming County, primarily those in the greater Williamsport area, had service available to them, varying from minor care by a first-aid worker to care by a nurse working under the supervision of a part-time physician. Approximately 9,000 employees were in plants where the services of a full-time nurse were available.

Values of Program

The value of in-plant health programs has been attested to by many industries in the Williamsport area. Mr. H. D. Evenden, management's representative, Steelton Plant, Williamsport Division, Bethlehem Steel Co., with 1,500 employees, stated that its in-plant medical department cannot be evaluated in dollars and cents, but in the prompt and efficient care of injury and sickness. Through the work of its medical department, there has been better placement and less turnover of workers, and employees have become better educated in health and safety matters, with a resultant decrease in lost time and increase in efficiency.

Mr. M. L. Hough, president of the Darling Valve and Manufacturing Co., with 650 workers, emphasized the special value of an in-plant medical department to an industry which has little turnover in personnel and consequently has an older worker population. In his plant, for example, the average age of the workers is 49.

This company had a first-aid station for many years. The present health room was set up in 1944 at a total cost, including all equipment, of \$5,000.

Prospective employees are given complete pre-employment examinations, including a chest X-ray. The company is now seriously considering the initiation of annual examinations for all employees in addition to the annual chest X-ray survey which the company has found to be very beneficial. The 1951 survey disclosed 26 suspicious chest conditions. The employees were referred to their family physicians immediately. One employee was found to have active tuberculosis, and he was placed in a sanitarium; one had cancer of the lung, and surgery has been performed. The other cases are being cared for by their family physicians or the State Chest Clinic. Each month the nurse contacts the family physician or the clinic to see that the employees are being periodically checked.

The company reports the following reduction in compensation rates over the past few years which it attributes largely to the work of the health room: 1949, 95.2 cents; 1950, 83.0 cents; 1951, 75.3 cents; 1952, 74.1 cents.

Mr. Hough indicated also that the dispensary has reduced the number of physician referrals because of better in-plant attention and has

therefore saved both the time of the employees and the expense to the company of more extensive medical service.

Mr. Clair W. Bishop, personnel director of the Lycoming division of the Aviation Corporation, with 2,200 employees, has been in charge of the medical departments in his company's plants since 1926. He stated that he has seen prompt and proper care provided in the plant to persons who would have suffered seriously by removal to the hospital or the doctor's office, that many small wounds were cared for which might have been serious if not given prompt attention, and that many valuable hours are saved by having a medical department available at the plant.

Mr. J. M. Palmer, plant manager, Sylvania Electric Products, Inc., with 1,000 employees, reported that he would not want the responsibility of managing an industrial plant that did not have the security and protection that go with a well-equipped industrial health program. He considers such a program to be as important to a manufacturing unit as any of the equipment required to turn out merchandise. A 1951 report from this plant enumerated the following specific services: Of the 150 employees who were X-rayed, 8 were referred to their family physicians for further study of the chest, and 7 for further cardiac study. One active tuberculosis case was placed under treatment. Six other employees with potential tuberculosis are X-rayed every six months, and one potential diabetic is checked for sugar every 6 months by his family physician. At present, in addition to the 7 found in the recent X-ray program, there are 27 cardiac patients who are employed on a full-time basis and who are under the care of their personal physicians.

Mr. Lewis W. Kimmel, general manager of the Weldon Manufacturing Co., with 650 employees, emphasized the benefits, to both the worker and his family, of health education provided by the nurse who visits workers' homes for counselling and guidance. He believes that one of the special values of the program is in improved employee morale.

Mr. William R. Waldeisen, president and general manager of the Williamsport Narrow Fabrics Co., believes that safeguarding the health of his 250 employees requires the personal attention of management as well as that of the medical personnel. He stressed the important contribution that a versatile, well-trained nurse can make to improving health and employee morale. Mr. E. F. Millhouse, employment manager of the Spencer Heater Division of the Aviation Corporation, with 700 employees, stated that industry must concern itself with the health and welfare of its workers to protect its investment in trained personnel. His company has found that manhours lost because of sickness or injury are materially reduced and production is increased by making the services of a physician and nurse available.

Mr. J. Greiner, plant manager of the Williamsport Textile Corp., a division of the Celanese Corp. of America, with 775 employees, stated that his company's in-plant health program promotes accident pre-

vention, improves employee morale by providing an opportunity to discuss health problems with the nurse, and prevents hundreds of possible lost-time accidents by the treatment of minor injuries. This results in savings to both employee and employer, since lost time means a loss for each.

In a Committee publication, Mr. John P. Stewart, president of the Williamsport Community Trade Association, emphasized the importance of maintaining the health of industrial employees, especially through well-organized community action. In the same publication, Dr. John W. Arbogast, president of the Lycoming County Medical Society, stated that the local medical society had worked for several years to promote a better understanding of the value of medical services in industry and the importance of keeping industrial workers in top-notch physical condition in peace- as well as in war-time.

In discussing the program after it had operated for about 5 years, Mr. C. E. Noyes, manager of the Williamsport Community Trade Association, listed the following results:

1. Over 10,000 of the 14,500 industrial employees in Williamsport were in plants having medical programs or health units. This service had doubled since the inauguration of the program.

2. Employees and their wives had been greatly impressed with the importance of proper nutrition.

3. Absenteeism decreased materially in plants with medical departments.

4. At least six of every seven employees in Williamsport were protected by sickness and accident insurance and by health insurance ranging from partial benefits to hospitalization and medical and surgical benefits.

5. Approximately 85 percent of all factory workers had had chest X-rays. In addition, 7,300 school children, teachers and other school personnel, and about 2,000 other citizens had received such service during the years 1945 and 1946.

6. Wasserman tests had been given to the majority of the employees.

Dr. Harley has said that inquiries concerning the Williamsport Industrial Health Program have come from many cities and states and from several other countries. Cooperation in the health field in Williamsport has been so successful that the community has recently organized all the voluntary health agencies into a health council and is considering a multiphasic or multiple health screening program, similar to those now operating in Richmond, Virginia, and Atlanta, Georgia. Dr. Harley stated that the Industrial Health Committee has conferred with both the State and county medical societies and with the Bureau of Industrial Hygiene of the Pennsylvania Department of Health regarding this project.

Dr. Harley and Mr. Noyes recently indicated that the present employment situation is so similar to that of World War II that the

Williamsport plan is being revitalized. The program grew substantially during the war, but in the subsequent demobilization period health activities slowed down. The need to protect manpower and thereby increase production is the same today as when the plan was organized in 1942, as the result of an appeal made to medicine and industry by the Chairman of the War Manpower Commission. At present, Williamsport proposes to redouble its efforts to stimulate the introduction of programs in industries where they are lacking and to urge that existing programs be strengthened and expanded.

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The Philadelphia Medical Society— Chamber of Commerce Small Plant Program, Philadelphia, Pa.

Established in 1943 as a joint enterprise of the Philadelphia County Medical Society and the Health Committee of the Chamber of Commerce and Board of Trade of Philadelphia, the program set as its first aim the promotion of medical care in small plants in Philadelphia County.

The Commission on Industrial Health of the State Medical Society of Pennsylvania was the motivating agent behind this program. In order to achieve its objective, "to assure the best possible health to every worker in every industry within the State," the Commission mapped out an intensive program and strongly urged county medical societies in the State to establish industrial health committees.

THE STATE PROGRAM. In addressing the Section of Preventive and Industrial Medicine and Public Health at the American Medical Association convention in June 1940, the late Dr. Charles-Francis Long, chair-

man of the State Commission, described the State program in detail and advocated the development of similar programs in other States. He pointed out that only two-thirds of the State medical societies then had committees on industrial health, but that the Committee on Industrial Health of the American Medical Association had gone far in comprehending the need for action.

The State committee, Dr. Long said, should represent all districts of the State, the general practitioner, and the medical teaching faculties wherever they are present. He urged that State committees be changed to commissions and that appointments to the commissions be staggered so that the work would be of a permanent nature and there would be complete continuity of thought and effort.

Dr. Long stated that the first efforts of such State commissions should be the establishment of county committees on industrial health to facilitate contacts with individual physicians and industrial plants. These county committees, Dr. Long said, must show the industrial physician that he must keep within the confines of the working place; likewise, they must show the general practitioner that the industrial physician is a case-finder for him.

"Finally, these committees have probably the biggest job of all," Dr. Long said. "It is for them to consult with employer and labor groups in providing adequate medical services to all types of workers. Paradoxically, the difficulty and need for this phase of county committee work increase as the size of the plant decreases."

In Pennsylvania, the problem of improving industrial health was approached gradually through a coordinated program of the State and county committees, industrial organizations, and labor groups. The first project was a survey to provide information on the number of physicians already rendering medical service to industry; the number of practicing physicians willing to devote time to learning the fundamentals of industrial health in a refresher course; the number of industries in the State, broken down by size of employee population; and the number of industries having plant physicians.

The next important step by the State committee was to assist the medical profession to develop adequate programs of industrial hygiene successfully in both large and small industries. "Let us honestly admit right now," said Dr. Long, "that the profession is not trained to take over the job. We are not prepared to meet the employer's requirements or to meet the employees' expectations. The State committee should therefore be ready to submit to the group a curriculum for refresher courses on industrial health, workmen's compensation laws, and occupational disease laws. Whether there should be peripatetic teaching units sent throughout the State will depend on the judgment of each committee." Dr. Long also called attention to the lamentable lack of familiarity with industrial health among the vast majority of medical students, stating that less than 10 percent of the 77 medical schools in

the country gave required undergraduate instruction in this subject and that only a few of these courses could be considered "adequate."

ACTION BY PHILADELPHIA COUNTY MEDICAL SOCIETY. Realizing the importance of the State medical society's program, the Committee on Industrial Health of the Philadelphia County Medical Society promptly began action. To determine the extent of industrial health services in Philadelphia County, the Committee requested the Bureau of Industrial Hygiene of the Pennsylvania State Health Department to make a survey of all industries in the county. Because of the war, the survey could not be completed, but information was secured on approximately 1,000 plants. The information revealed that, while most of the larger industries had adequate medical services, plants with 500 workers or less were woefully ill-equipped or completely lacked services.

So that a sufficient number of physicians and nurses would be informed on at least the rudiments of industrial health, the Committee, as its second step, established a course in industrial health under the direction of professors from the University of Pennsylvania and the Women's Medical College. Members of the medical society and trained nurses accredited by an official organization were eligible for enrollment at a tuition fee of \$25. Upon completion of a broad course of 48 hours' instruction, including a number of extracurricular field trips, a certificate was awarded those who had attended three-fourths of the sessions. Sixty physicians and nurses received certificates.

The Committee also arranged for the 200 members of the Philadelphia Industrial Nurses Association to have an opportunity to meet with members of the county medical society for discussions on procedures and problems of industrial medical and nursing practice.

Realizing that the medical profession alone could not bring health service to industry but that the active cooperation of business organizations and labor groups was essential, the Committee next enlisted the assistance of the health committee of the chamber of commerce and board of trade in promoting health programs in small plants.

The Program in Operation

After several meetings to discuss the scope of their activities, the two committees agreed to limit their first project to promoting employee health services in the 178 companies with from 250 to 500 employees which the survey had shown to be in need of medical services.

As one of its first actions, the chamber of commerce, through its executive committee, contacted the Central Labor Union Council in Philadelphia and received both A.F. of L. and CIO endorsement of the project. This proved to be very important, since it assured proper understanding on the part of the labor unions as to the purpose of the project. It was also a means of showing the worker that plant medical service is "something which must be done with and not to him." The experience of this program emphasized the fact that the cooperation of

workers and their organizations is essential to the development of a successful in-plant health program.

The president of the chamber of commerce in the fall of 1943 sent to each of the 178 industries a series of three letters, spaced a week apart. The first two letters were designed to arouse interest, and the third invited employers to meet with members of the health committee at a specified time. Seventeen industries, the A.F. of L., the CIO, and the Railroad Brotherhoods sent representatives to the meeting. Following the meeting, twenty employers requested additional information on their plant requirements. Members of the health committee visited their plants and as a result five in-plant programs were established.

Two physician members of the chamber of commerce and board of trade committee prepared a simple pamphlet, in question-and-answer style, which emphasized the advantages of industrial health coverage in small plants and proved to be very useful in promoting the program. The pamphlet, later reprinted in full by the Council on Industrial Health of the American Medical Association, appears in the appendix in exhibit 5.

The two committees next developed a detailed set of instructions, outlining the steps to be taken to arouse the interest of industry in establishing in-plant health programs. Also included were an outline of the medical service organization plan with instructions as to how to put it into effect, suggestions on the selection of a physician and nurse, and information on the method of arriving at professional fees and the space and equipment needed. A copy of the suggested procedure and the promotional letters appear in the appendix in exhibit 4.

In addition to personal contacts, the committees sponsored group meetings with executives of various types of industry, such as textiles and the metal trades, to discuss the advantages of industrial health programs. Special attention was given to industrial groups having high illness and accident rates.

TYPE OF SERVICE RECOMMENDED. The two committees recommended an in-plant service in which a nurse would be on duty for at least twice the number of hours that the physician would spend at the plant. The Committee recognized that, as interest grew in developing small plant health programs, other methods of providing service would have to be used. Five methods already in operation were suggested as alternatives:

1. A general practitioner interested in industrial health is hired by management on an hourly basis. This plan had been tried with success in Lycoming County. (See p. 118.)

2. Services are provided by a physician who fills his time completely with engagements in industrial health on an hourly basis, thus becoming a full-time industrial physician. There was a record of only two such physicians in Philadelphia at that time.

3. A physician conducts a dispensary supported on a subscription

per capita basis in a building which houses several industries. The Fleisher Industrial Center had provided this type of service in Philadelphia for several years.

4. The management of a factory building containing several industries contracts with a physician to supervise a dispensary, in space set aside for the purpose by management. This is a variation of plan 3.

5. A central dispensary is established in the neighborhood of a group of small industries and is run by a physician with the aid of a full-time trained nurse. Many hospitals and a few insurance companies in Pennsylvania have established industrial clinics, but so far have limited their care to treatment of industrial accidents only. A change in point of view was thought to be necessary to adapt these clinics to complete industrial health services, but at least the equipment and personnel were at hand.

Response by Industry

The committees within the first two years contacted 623 industries, 98 of which instituted some form of medical service plan or extended services already in existence. Since 1945, an additional 3 industries are known to have established health programs as a direct result of the Committees' work, while many more programs probably have come into being as an indirect result.

Various factors account for the initiation and continuation of in-plant health programs. Dr. Everts recently enumerated the following reasons that he believed motivated the Philadelphia plants to start their health programs: (1) Very poor accident record—insurance company is urging better care of accidents; (2) forthright realization that one, or two or more, quite serious and costly accidents could at least have been minimized if competent early in-plant care had been available; (3) realization of a poor absenteeism record; (4) competitor plants have a medical service; (5) firm belief in personal health care and awareness of value of good health among employees; (6) untimely death of two or more key people or executives; (7) last, and more recently and increasingly significant, the definite trend among unions toward writing a health coverage clause in their contracts which may attempt to dictate the amount and kind of medical care if something satisfactory to them is not already in existence.

Current Developments

In recent years, the Health Committee of the Chamber of Commerce and Board of Trade, with the endorsement of the county medical society, has taken the leadership in stimulating small plant health programs. Through the health committee of the chamber, industry is able to obtain not only general information on in-plant health programs but also personal advice on inaugurating such programs and on the selection of doctors and nurses. Dr. Everts recently stated at a meeting of the Industrial Relations Association of Philadelphia that the health com-

mittee stands ready to make available to any group or to any single executive general information on medical services or specific information related to a particular plant. Dr. Everts and several other industrial physicians and executives will leave their own work and meet with any executive to tell him what they know about setting up medical services in either a very small or a very large plant and why, in their opinion, such programs pay. This help is available to any plant for the mere asking.

The health committee is now putting special emphasis on the use of existing community facilities, especially by small plants that cannot afford a clinical laboratory. The following four surveys that are now available in Philadelphia are being brought to the attention of industry: (1) A chest X-ray survey by the Philadelphia Tuberculosis and Health Association, (2) a blood test for syphilis by the division of venereal disease control of the city's health department, (3) a dental survey by the dental survey laboratory under the division of industrial hygiene of the department of health of Pennsylvania, and (4) a survey by the Philadelphia Committee for the Prevention of Blindness.

Over the past few months, a joint committee of the industrial health section of the chamber and the medical school of the University of Pennsylvania have been appraising the needs and facilities for greatly increased activity in the industrial health field, especially in small plants. The findings of the study were presented at a dinner given on Jan. 22, 1952, by Albert M. Greenfield, president of the chamber, to 100 industrial, medical, and business leaders. The report was presented by Dr. Lemuel C. McGee, medical director, Hercules Powder Company, Inc., Wilmington, and a guest lecturer at the medical school. The recommendations resulting from the study included: (1) A plan for integrating the industrial medical viewpoint into undergraduate teaching, with the possibility of a full- or part-time professorship of industrial health and hygiene on the staff of the University; (2) the extension of in-plant medical services to small plants to amplify a program now being carried on by the chamber; (3) the longer range view of establishing health maintenance clinics in strategic areas; and (4) the stimulation of an active interest in a coordinated program of industrial medical and surgical research.

In commenting on the program, Mr. Greenfield said that it represented an effort on the part of one of the great medical schools to tailor its graduate and research training to the needs of a rapidly expanding industrial community.

The responsibility for the development and implementation of the suggested program was assigned to Dr. Everts and Dr. J. P. Hubbard, director, Department of Public Health and Preventive Medicine, at the Medical School of the University of Pennsylvania. A recommendation for the development of an undergraduate course in industrial hygiene, which would include a fair consideration of the practice of medicine in

industry, was made by Dr. Everts as early as 1939 at a meeting of the Industrial Hygiene Section of the American Public Health Association. It was based on his then 13 years of experience in stimulating and supervising health programs in small firms—seven years with the Philadelphia Health Council and the Tuberculosis Committee and six years in private industrial practice. Definite efforts along this and similar lines were being made at that time by the then relatively new Council on Industrial Health of the American Medical Association.

As the first step in building the industrial medical viewpoint into graduate teaching at the medical school of the University of Pennsylvania, it is now planned to have 30 of the senior medical class, in groups of six, spend about three hours in each of five or six different industries studying the work of the medical department, in addition to having lectures on the subject prior to the visits. Another related proposal now under consideration is that industries with adequate medical departments hire junior medical students to work during summer vacations without any medical status as assistants to the nurses. The plan was tried last summer in a few firms where it was found that the students profited greatly from their experience and the industries believed that the students provided enough services to justify their salaries.

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Correspondence and personal interviews, 1951-52.

Individual Programs

Allen Manufacturing Co., Hartford, Conn.

Ellsworth S. Grant, Vice President of Industrial Relations

Type of industry: Manufacturer of socket screws, hex keys, and related products.

Number of shifts worked: 2; working a 5-day week of 45 hours.

Average number of employees: 595 in 1951. Average employment ranged between 428 and 598 from 1945 to 1950.

In-plant Medical Program

Number of locations served: 1; 3 buildings.

Growth of medical department: The department was established in 1941, with a full-time nurse and a part-time physician to give pre-employment and return-to-work examinations. An additional nurse was employed during World War II, when the physician left for military service. Pre-employment examinations were then given on a fee-for-service basis by an outside doctor who also handled the company's compensation cases; reexaminations and record control had to be neglected during this period.

In 1944, the assistant medical director of another manufacturing company was employed part time, and pre-employment and periodic examinations were again given at the plant. This arrangement greatly increased the usefulness of the medical department.

In 1946, the company's personnel director was instrumental in organizing The Hartford Small Plants Group Medical Service, through which physician's services are now provided. (For a description of the Hartford Service, see p. 96.)

Medical personnel: One part-time physician, who is at the plant 8 hours a week, and two full-time nurses provide services in the plant.

Facilities: The medical department is air-conditioned and is located on the second floor of the main building, near the elevator, so that emergency cases can be transported easily. It consists of an anteroom, a first-aid room, a consultation room, and a bath.

Services provided: In addition to regular pre-employment and periodic physical examinations, special examinations are provided for employees transferring to heavier work, for those absent two weeks or longer because of illness, for participants in employee sports, and monthly for cafeteria workers. The management is informed only when medical findings show defects affecting the applicant's ability to hold the job.

for which he is being considered or when they indicate that the employee's transfer to another job is necessary.

Periodic physical examinations are offered all employees and are compulsory for those over 65 years of age. The company has a definite policy of hiring the rehabilitated, and the medical department periodically sees the employees who are cardiacs and epileptics and those with arrested tuberculosis. In 1949, 25 percent of the employees were examined. Employees are counselled on the basis of findings and referred to their family physician when necessary.

In-plant care is provided for minor industrial and nonindustrial illnesses and injuries. Services include diathermy and infrared treatments. Outside arrangements are made for more serious injuries, for X-rays, and for all eye cases.

Prescription safety glasses are obtained for all employees at a reduced rate; other safety goggles required for certain jobs are provided and paid for by the company with a 50-cent deposit required of each employee. The optician calls twice a month at the plant and adjusts the employees' glasses without charge. Safety shoes are also furnished at reduced prices.

Other services include health counselling, with referral to the family physician for treatment. A special counselling and health education program is provided for pregnant workers. Cold serum is offered twice a year, and influenza vaccine is provided at cost and administered by the nurse. Annual chest X-rays are given at the plant, on a voluntary basis, by the city health department. (An X-ray is required of all new employees.)

The physician makes periodic inspections of the cafeteria. The nurse acts as secretary of the safety committee, maintains a list of employees who have volunteered to give blood transfusions, and files insurance claims.

Employees absent one day or more for any reason, illness or otherwise, must report to the nurse before returning to work. If absent a week or more they must report first to the nurse and then to the personnel department for their time cards. Any employee who is absent two consecutive weeks or more because of illness or injury must be reexamined by the industrial physician unless he has a note from his own physician.

Medical records: A daily record is maintained of all visits to the medical department. In addition to an individual, continuing record on each employee, a daily statistical summary sheet is prepared showing the number of visits by sex of employee, type of injury or illness, and the plant department in which the patient is employed. Absence control records are also maintained. Monthly, semiannual, and annual reports are made to the personnel director.

The individual folder for each employee includes complete physical examination forms, Wassermann returns, X-ray returns, carbon copies

of physician's letters to employees, compensation claim forms, and a record of employee visits and consultations.

Cost of program: For the calendar year 1951, the operating cost of the program averaged \$24.65 per employee; \$0.011 per manhour worked; and \$0.97 per employee visit.

Program Evaluation

Reduction in absenteeism: The absentee rate for all reasons, including leaves of absence, had been reduced from 5.8 percent in 1943 to 1.8 percent in 1950. It rose to 2.7 percent in 1951.

Rate of labor turnover: From 1943 to 1948, the monthly turnover rate was much lower than the average for the Hartford area; in 1949, because the plant had an unusual number of layoffs resulting from the recession, its rate exceeded that for the area. In 1948, the average monthly rate had decreased by 80 percent from the company's 1943 rate, while the corresponding reduction in the area was only 50 percent. During both 1950 and 1951, the company's rate was 0.7 percent, which represented an 87 percent decrease since 1943.

Reduction in workmen's compensation premiums: Premium rates were reduced by 24 percent between 1946, the year in which the present program started, and 1950, despite increased costs due to changes in the Workmen's Compensation Act. Over 2,000,000 manhours (1½ years) were worked without a lost-time accident.

Increased production: In 1950 and 1951, the employees earned an average group bonus that was 46.5 percent higher than that in 1945. Based on the dollar volume of company sales per employee in 1940, sales per employee were 50 percent and 80 percent higher in 1950 and in 1951, respectively, than in 1945, if price changes during this period are ignored.

Additional detailed statistical data on results of the program are given on page 199.

Effect on employee morale: In the opinion of the personnel director, the company's health and safety programs, together with group insurance, form a keystone of employee relations; these have contributed substantially and consistently to maintaining a high degree of both employee satisfaction and day-to-day employee efficiency.

Health and Welfare Benefits

Benefits available through a commercial group insurance policy include: \$2,000 life insurance; \$2,000 accidental death and dismemberment insurance; sickness and accident benefits of \$25 a week up to 26 weeks, with payments beginning on fourth day of disability due to sickness; hospitalization allowances of \$10 a day up to 31 days with unlimited allowance for incidental expenses; hospitalization for dependents, including maternity benefits up to \$100 hospital charge; surgical care for employees up to \$200, according to fee schedule.

The first group insurance program was started in 1935; the present

plan was inaugurated in 1950. The plan is jointly financed, employer and employees each paying approximately 50 percent of the premium. In 1951, the total annual cost of the program per manhour was \$0.06.

Source: Data collected through correspondence and personal visit to the Allen Manufacturing Co.; and Seybold, Geneva: *Personnel Administration in the Small Company (Studies in Personnel Policy, No. 117)* New York, The National Industrial Conference Board, 1951. pp. 7-29.

Frank H. Fleer Corp., Philadelphia, Pa.,

W. E. Diemer, Works Manager

This company manufactures gum. Average number of employees in 1951, 265; 35 percent male. Number of locations served, 1.

In-plant Medical Program

Medical personnel: One part-time physician is at the plant 3 days a week for a total of 6½ hours, and 1 registered graduate nurse is on duty full time.

Facilities: The dispensary consists of a waiting room, a first-aid room, and a consultation room. Size of the dispensary is approximately 215 square feet.

Cost of Program in 1951

Total \$8,029, composed of \$6,256 for salaries, \$434 for medical supplies, \$422 for outside physician and laboratory fees, \$603 for chest X-rays taken in connection with pre-employment examinations and yearly surveys, \$47 for transportation, \$61 for medical forms, \$13 for miscellaneous expenses, and \$193 for employees' time in the dispensary. The average annual cost per employee was \$30.30; the average annual cost per employee 10 years previous had been \$21.

Steps Taken by Company to Reduce Absenteeism

A pre-placement examination including chest X-ray, serology and urinalysis; periodic physical examinations for all employees, including key personnel; examination of employees before returning to work after illness; encouragement of use of dispensary facilities at onset of illness for diagnostic purposes; cold vaccine program; annual chest X-ray survey; referrals to family doctor; home and hospital visits by plant nurse; complete health record kept on all employees as to visits to dispensary, past illnesses, and treatments; leave of absences granted as approved by company physician for recuperation purposes.

Steps Taken by Dispensary to Reduce Labor Turnover

Pre-placement examinations; instruction to new employees on procedure of reporting accidents; sanitation inspection by plant physician and nurse; development of general feeling among employees that the dispensary exists to help them; emotional problems handled by doctor and plant nurse.

Steps Taken to Reduce Workmen's Compensation

Reporting all accidents to department supervisor; immediate treatment at dispensary or hospital and close follow-up of injury by plant nurse and doctor; safety inspection by plant committee; rehabilitation-job placement and use of dispensary facilities for treatment.

A. C. Horn Co., New York, N. Y.

Mr. John A. Denny, Director of Industrial Relations

This company manufactures paints, lacquers, varnishes, and waterproofing materials. Average number of employees in 1951, 230; 90 percent male. Number of locations served, 2.

In-plant Medical Program

Medical personnel: One part-time physician is at the plant 3 days a week for a total of 5 hours, and a nurse from the Visiting Nurse Service of New York is on duty 5 days for a total of 25 hours per week.

Facilities: The dispensary consists of a waiting room, first-aid room, consultation room, and bath. Size of the dispensary is approximately 400 square feet.

Cost of Program in 1951

Total \$5,300, composed of \$4,400 for services of physician and nurse, \$300 for medical supplies, and \$600 for cleaning. Other costs, such as space, light, and heat, are not charged to the health program. The average annual cost per employee was \$23.00; the average cost per manhours worked was \$.013; the average cost per dispensary visit was \$1.05. The initial cost of facilities and equipment was \$2,000.

Scope of service provided: Pre-employment, periodic, and return-from-illness examinations and medical evaluation before transfer to new work; referral to private physician and to clinics for diagnosis and treatment; treatment and advice regarding occupational complaints and non-occupational complaints of an emergency nature; health counselling; nutrition advice as needed; social service referrals; weekly plant tours by physician and nurse.

Number of services provided in 1951: Pre-employment examinations, 114; periodic examinations, 22; physician-employee health consultations, 980; nurse-employee health consultations, 4,209; referrals to family physician or community health facility, 55.

Ketterlinus Lithographic Manufacturing Co., Philadelphia, Pa.,

J. Louis Landenberger, President

Average number of employees, 180 during 8 months with an increase to 300 during 4 months of the year; 80 percent male. Number of locations served, 1.

In-plant Medical Program

Growth of medical department: The medical program was established in 1931. It was one of the small plants included in the cooperative programs developed by the Philadelphia Health Council and the Tuberculosis Committee. After the close of the demonstration project, the medical direction was continued by Dr. Glenn S. Everts until May 1948. There have been two subsequent changes in medical directors, the present one having assumed the position in May 1951.

Medical personnel: One part-time physician is at the plant 3 days a week for a total of 4½ hours, and a nurse from the Visiting Nurse Society of Philadelphia is on duty 5 days a week for a total of 9 hours. The same hours of services were available during 1950.

Facilities: The dispensary consists of an anteroom, first-aid room, and a consultation room.

Cost of Program

In the early years of the program, the services cost a little more than \$8 per employee a year. Since 1948 the average annual cost per employee has varied from \$11.18 to \$11.81. The cost per dispensary visit averaged between \$1.90 and \$2.00 in each of the years 1948, 1949, and 1950. In 1951, because of the increased use of the service, the cost dropped to \$1.30 per visit. Included in the dispensary cost are only the salaries of the plant physician and nurse and the cost of medical supplies and equipment. The initial cost for construction and equipment was \$2,600.

Utilization of Service

The following tabulation indicates the number of cases and the utilization of service during the past 2 years:

Item	1951	1950
Visits to dispensary, total	1,972	1,273
Industrial cases:		
First visits	134	117
Revisits	196	167
Nonindustrial cases	1,487	792
Unspecified	155	197
Reportable injuries	15	19
Lost-time accidents	2	1
Days lost from accidents	29	8
Lost time, nonindustrial cases	40	19
Days lost from nonindustrial cases	451	473
Physical examinations:		
Pre-employment	17	47
Reexaminations	19	57
Referrals to private physician	27	30
Referrals to hospitals and other	33	7

Values

Particular emphasis is put on health education and supervision, and the value of these services has increased steadily during the 20 years the dispensary has been in operation. The medical department feels that the frequent use of the dispensary for preventive medical services

by the executives of the company tends to enhance its value in the eyes of the employees and to encourage their use of the service.

Medical department reports show a high incidence of non-occupational cases. Referrals to private physicians, hospitals and clinics have contributed to the decrease in the severity rate of non-occupational illnesses. Four employees who lost from 20 to 111 days in 1950 lost no time because of illness in 1951. They are under the care of private physicians and report to the dispensary periodically for health supervision.

The effectiveness of the health education program is demonstrated by the fact that 90 percent of the employees participated in a voluntary X-ray survey in 1951. As a result of the findings of this survey, chest X-rays may now be included as part of the pre-placement examination.

Appendices

Labor Force

TABLE 1.—Estimated number of reporting units and estimated employment in units with wages taxable under the Old-age and Survivors Insurance Program, by industry and size of unit, March 1948.

TABLE 2.—Estimated employment in all reporting units with taxable wages for January-March 1948 under Old-age and Survivors Insurance Program and number of reporting units, by State and region and size of reporting unit.

TABLE 3.—Distribution of manufacturing establishments and of employees, by size of establishment, 1950 and 1947.

Disability

TABLE 4.—Average annual number of absences lasting 1 calendar day or longer due to sickness and injuries, annual number of days of disability per person, and average number of days per absence, by cause; experience in a public utility, 1946-50, inclusive.

TABLE 5.—Annual number of absences lasting one calendar day or longer due to sickness and injuries, by sex, according to duration; experience in a public utility, 1946-50, inclusive.

TABLE 6.—Percentage distribution of disabled persons in the civilian noninstitutional population, 14 to 64 years of age, by duration of disability prior to day of visit, United States, February 1949.

TABLE 7.—Annual rate of absenteeism among male and female employees, for two companies subscribing to the New Haven Industrial Medical Service, 1944 and 1945.

TABLE 8.—Estimated number of disabling work injuries and resulting time lost, United States, 1937-50.

TABLE 9.—Work-injury frequency rates and indexes of work-injury frequency rates (manufacturing), by extent of disability, United States, 1926-49.

Trends in Employee Health Programs

TABLE 10.—Estimated number of persons eligible for specified health and disability benefits through voluntary programs, by type of program, United States, December 31, 1951.

TABLE 11.—Distribution of members in 149 industrial plans providing physician's service or hospitalization, by type of medical care and type of plan, December 31, 1949.

EXHIBIT 1.—Suggested principles for lay sponsored voluntary health plans, American Medical Association.

TABLE 12.—Number of surveyed firms reporting on employee benefit programs, percent reporting specified type of program, and percent of employees in reporting firms covered, by employee size class and industry group.

TABLE 13.—Workmen's compensation coverage of occupational diseases, by State and type of coverage, January 1, 1952.

In-plant Health Facilities and Personnel

TABLE 14.—Total number of physicians specializing in industrial medicine, and number of registered graduate nurses employed full time in industry, United States, 1950.

TABLE 15.—Percent of employees eligible for specified services in industries classified according to size, Chicago-Cook County Survey, 1946.

TABLE 16.—Percent of plants in each specified size group having services of physician or nurse and number of physicians and nurses serving plants, State of Pennsylvania, 1951.

TABLE 17.—Number and percent of employees, in plants of specified type, eligible for services by a physician or nurse, State of Pennsylvania, 1951.

EXHIBIT 2.—Educational institutions offering courses in industrial hygiene.

TABLE 18.—Percent of surveyed companies in each size group reporting specified type of health program, 1950.

TABLE 19.—Percent of manufacturing establishments and of employees, in each specified size group, with adequate physician and nurse service, State of New Jersey, 1945.

TABLE 20.—Percent of employees in plants, classified according to size, to whom specified health and medical services were available at the plant or elsewhere, Chicago-Cook County Survey, 1946.

TABLE 21.—Types of physical examinations provided in surveyed companies of specified size, 1950.

TABLE 22.—Number and percent of surveyed establishments in each size class employing specified type of medical, nursing, and auxiliary personnel.

TABLE 23.—Distribution of companies according to percent of applicants rejected as a result of pre-employment physical examinations, selected studies, 1924-51.

EXHIBIT 3.—Reasons often given by small industries for not having health departments.

Promotion of Small Plant Programs

EXHIBIT 4.—Procedure for establishing a small plant health service.

EXHIBIT 5.—How a plant medical service operated: Questions and answers prepared by the Health Committee of the Chamber of Commerce and Board of Trade of Philadelphia.

EXHIBIT 6.—Agreement between physician and companies participating in Hartford Small Plants Medical Service.

EXHIBIT 7.—Williamsport promotional letters.

Essentials of an Adequate Program

EXHIBIT 8.—The minimum standards for medical service in industry, American Foundation of Occupational Health.

EXHIBIT 9.—Working principles of an adequate medical service.

EXHIBIT 10.—Essentials of an industrial dental service.

EXHIBIT 11.—Principal defects of medical services in industry.

Industrial Nurses

EXHIBIT 12.—Duties and responsibilities of the nurse in industry.

EXHIBIT 13.—Recommended qualifications for industrial nurses working without nursing supervision.

EXHIBIT 14.—A yardstick for measuring industrial nursing services in your plant.

EXHIBIT 15.—Names of directors and addresses of nonofficial agencies providing part-time nursing service to industry, 1950.

Facilities and Equipment

EXHIBIT 16.—Examples of floor plans: first-aid rooms for a small plant; dispensary for a small plant; medical department for a medium sized plant.

EXHIBIT 17.—Equipment for small plant dispensary recommended by the Council on Industrial Health, American Medical Association.

EXHIBIT 18.—Suggested quarters and equipment for a small plant medical department, Astoria-Long Island City program, 1945.

Record Keeping

EXHIBIT 19.—Nurse's daily report work sheet.

EXHIBIT 20.—Monthly report on number of visits by reason for visit and department, and disposition of cases.

EXHIBIT 21.—Suggested form for individual service record.

EXHIBIT 22.—Referral form to private physician and form for use by physician in reporting back to industry.

EXHIBIT 23.—Procedure for establishing and recording cost of health services in industry (small plants).

Cost and Values

TABLE 24.—Companies reporting cost data on health, medical and safety programs, and average per capita cost, by size of plant, 1950.

TABLE 25.—Plants reporting cost data on in-plant medical programs and the average per capita cost, by size and type of plant, 1949.

TABLE 26.—Persons employed, original investment, monthly cost of health program, and number and type of medical and auxiliary personnel employed in 12 small establishments.

TABLE 27.—Estimated annual cost of cooperative health center serving a group of small plants, by type of expense and number of employees served, 1950.

TABLE 28.—Cost of installing and equipping medical departments in seven small plants participating in Astoria-Long Island City Program, 1945.

EXHIBIT 24.—Advantages of plant medical service.

EXHIBIT 25.—Conclusions regarding medical services in small and medium-sized plants, Liberty Mutual Insurance Company.

TABLE 29.—Distribution of surveyed establishments according to report on special benefits derived from medical department operations.

TABLE 30.—Measures of value of medical and personnel program, Allen Manufacturing Company, Hartford, Connecticut, 1943-51.

Occupational Health Services of Governmental Agencies

TABLE 31.—Participation in designated items of industrial hygiene programs of State health departments during fiscal year 1951 and planned for 1952.

EXHIBIT 26.—Federal, State, and local industrial hygiene agencies.

EXHIBIT 27.—Industrial hygiene services provided gratuitously by the Bureau of Industrial Hygiene of the Pennsylvania Department of Health, Williamsport, Industrial Health Program.

Table 1.—Estimated number of reporting units and estimated employment in units with wages taxable under the Old-age and Survivors Insurance Program, by industry, and size of unit, March 1948

Type of industry ¹	Employee size class						
	All establish- ments	1-19	20-49	50-99	100-499	500-999	1,000 and over
Number of reporting units ²							
Total	2,734,152	2,488,865	149,030	50,536	38,351	4,391	2,979
Agriculture, forestry and fishing	13,488	12,940	434	79	35	0	0
Mining	28,602	22,291	3,240	1,373	1,365	234	99
Contract construction	216,186	198,016	12,229	3,666	2,089	142	44
Manufacturing	271,107	185,716	40,922	19,558	20,076	2,788	2,047
Public utilities	102,791	87,175	8,643	3,423	2,852	377	321
Wholesale trade	248,066	218,422	20,608	5,937	2,883	161	55
Retail trade	944,009	896,411	34,345	8,325	4,253	388	287
Finance, insurance, and real estate	226,181	213,125	8,432	2,550	1,846	147	81
Service industries	631,668	603,371	19,632	5,534	2,933	153	45
Not elsewhere classified	8,923	8,802	86	18	16	1	0
Unclassified	43,131	42,596	459	73	3	0	0
Number of employees (in thousands) ³							
Total	35,805	9,725	4,493	3,466	7,619	3,012	7,489
Agriculture, forestry and fishing	70	47	12	6	6	0	0
Mining	955	123	100	95	295	162	181
Contract construction	2,030	862	367	251	381	98	72
Manufacturing	15,198	1,152	1,275	1,360	4,182	1,921	5,308
Public utilities	2,617	392	265	236	577	260	886
Wholesale trade	2,800	1,069	618	402	510	104	96
Retail trade	6,722	3,424	1,009	562	791	266	671
Finance, insurance, and real es- tate	1,741	672	252	174	354	100	189
Service industries	3,527	1,859	584	375	521	102	85
Not elsewhere classified	27	20	3	1	3	(⁴)	0
Unclassified	117	103	9	5	(⁴)	0	0

¹ Data for manufacturing industries are classified according to the Standard Industrial Classification Manual prepared by the Bureau of the Budget in 1945. Data for nonmanufacturing industries are classified according to the Social Security Industrial Classification Codes, prepared by the Federal Security Agency in 1942.

² A reporting unit is an establishment or a group of establishments of the same firm engaged in the same activity and located in the same area, generally the same county. Size of reporting unit is measured by the number of persons employed in the unit during the pay period ending nearest middle of March 1948.

³ Represents estimated employment during pay period ending nearest middle of March 1948 for employers who reported taxable wages under the OASI program for January-March 1948.

⁴ Less than 1,000 persons.

Source: Klem, Margaret C., McKiever, Margaret F., and Lear, Walter J., M.D.: *Industrial Health and Medical Programs* (P.H.S. Publication No. 15). Washington, Government Printing Office, 1950. pp. 39-43.

Table 2.—Estimated employment in all reporting units with taxable wages for January–March 1948 under Old-age and Survivors Insurance Program and number of reporting units, by State and region and size of reporting unit¹

State and region	Employ- ment ²	Number of reporting units of specified size						
		All units	1-19	20-49	50-99	100-499	500-999	1,000 and over ³
United States and Territories.....	35,805,786	2,734,152	2,488,865	149,030	50,536	38,351	4,391	2,979
New England.....	2,788,786	187,710	169,573	10,615	3,654	3,165	418	285
Connecticut.....	677,722	41,971	38,147	2,235	749	658	91	91
Maine.....	205,440	18,358	17,042	785	279	207	27	18
Massachusetts.....	1,428,620	92,891	83,251	5,625	1,997	1,672	204	142
New Hampshire.....	140,859	11,525	10,552	555	189	197	23	9
Rhode Island.....	261,310	15,380	13,639	998	322	335	64	22
Vermont.....	74,835	7,585	6,942	417	118	96	9	3
Middle East.....	10,363,206	718,069	646,581	42,441	15,183	11,668	1,269	927
Delaware.....	91,562	6,582	5,995	337	124	103	14	9
District of Columbia.....	226,901	17,626	15,759	1,186	405	244	16	16
Maryland.....	547,161	35,663	31,950	2,213	792	600	63	45
New Jersey.....	1,386,415	97,364	88,334	5,135	1,980	1,597	185	133
New York.....	4,645,994	358,145	323,016	21,810	7,396	5,042	500	381
Pennsylvania.....	3,018,504	174,755	156,288	10,221	3,968	3,563	420	295
West Virginia.....	446,669	27,934	25,239	1,539	518	519	71	48
Central.....	10,539,217	749,223	684,781	38,070	13,238	10,749	1,392	993
Illinois.....	2,664,452	186,466	169,407	9,832	3,655	2,960	372	240
Indiana.....	1,026,716	68,630	62,745	3,438	1,186	1,030	125	106
Iowa.....	439,281	51,965	48,843	1,994	670	398	35	25
Michigan.....	1,802,591	108,351	99,332	5,346	1,813	1,470	209	181
Minnesota.....	589,391	55,925	51,621	2,745	831	623	60	45
Missouri.....	924,444	74,894	68,224	3,963	1,416	1,100	122	69
Ohio.....	2,271,879	137,295	123,896	7,798	2,617	2,378	368	238
Wisconsin.....	820,463	65,697	60,713	2,954	1,050	790	101	89
Southeast.....	5,238,877	412,718	373,572	24,236	7,962	5,893	660	395
Alabama.....	497,915	34,628	31,184	2,155	660	509	67	53
Arkansas.....	211,458	23,877	22,044	1,190	380	241	17	5
Florida.....	536,677	55,708	51,027	3,057	958	598	52	16
Georgia.....	613,085	44,790	40,261	2,772	937	688	85	47
Kentucky.....	436,222	35,539	32,307	1,978	632	534	58	30
Louisiana.....	477,532	36,776	33,009	2,277	827	576	49	38
Mississippi.....	217,843	22,237	20,272	1,325	404	208	22	6
North Carolina.....	727,872	48,603	43,577	3,007	966	879	111	63
South Carolina.....	355,503	23,598	21,493	1,245	440	308	60	52
Tennessee.....	583,268	41,606	37,395	2,493	872	725	78	43
Virginia.....	581,502	45,356	41,003	2,737	886	627	61	42
Southwest.....	1,998,570	197,573	181,739	10,277	3,136	2,130	178	113
Arizona.....	122,891	13,680	12,652	700	186	126	8	8
New Mexico.....	84,993	10,426	9,693	534	130	57	10	2
Oklahoma.....	334,802	36,917	34,238	1,770	535	330	26	18
Texas.....	1,455,884	136,550	125,156	7,273	2,285	1,617	134	85
Northwest.....	1,222,567	152,437	142,714	6,509	1,987	1,092	83	52
Colorado.....	246,653	26,168	24,184	1,280	428	248	17	11
Idaho.....	81,393	10,665	9,973	482	129	73	5	3
Kansas.....	299,131	37,653	35,374	1,488	494	263	18	16
Montana.....	91,249	12,676	11,944	528	126	71	4	3
Nebraska.....	209,629	26,118	24,526	1,025	342	198	17	10
North Dakota.....	58,929	10,047	9,519	395	96	35	2	0
South Dakota.....	71,834	11,813	11,250	414	107	38	2	2
Utah.....	116,075	11,323	10,347	650	180	128	11	7
Wyoming.....	47,674	5,974	5,597	247	85	38	7	0

Footnotes at end of table, p. 146.

Table 2.—Estimated employment in all reporting units with taxable wages for January–March 1948 under Old-age and Survivors Insurance Program, and number of reporting units, by State and region and size of reporting unit¹—Continued

State and region	Employ- ment ²	Number of reporting units of specified size						
		All units	1-19	20-49	50-99	100-499	500-999	1,000 and over ³
United States and Terri- tories.....	35,805,786	2,734,152	2,488,865	149,030	50,536	38,351	4,391	2,979
Far West.....	3,341,673	307,258	281,574	16,393	5,224	3,515	361	191
California.....	2,475,658	222,992	204,199	11,970	3,820	2,598	251	154
Nevada.....	36,226	4,156	3,843	223	43	43	4	0
Oregon.....	325,043	33,365	30,551	1,797	617	351	38	11
Washington.....	504,746	46,745	42,981	2,403	744	523	68	26
Territories.....	102,890	9,098	8,326	480	147	120	18	7
Alaska.....	14,451	1,872	1,749	83	25	14	0	1
Hawaii.....	88,439	7,226	6,577	397	122	106	18	6
Maritime ⁴		66	5	9	5	19	12	16

¹ A reporting unit is an establishment or a group of establishments of the same firm engaged in the same activity and located in the same area, generally the same county. Size of reporting unit is measured by the number of persons employed in the unit during the pay period ending nearest the middle of March 1947. Although figures are shown to the last digit for tabulating purposes, they should not be considered accurate to the last digit.

² March 1948 employment represents the total number of persons employed during the pay period ending nearest middle of March 1948. Taxable wages are wages paid by employers for covered employment during January–March 1948, including wages over \$3,000 paid by any 1 employer to any 1 employee in a calendar year. Figures in this table may differ slightly from similar data in other tables because of processing procedures. Although figures are shown to the last digit for processing purposes, they should not be considered as accurate to the last digit. Totals for U. S. and Territories have been adjusted.

³ Includes 74 units employing 10,000 or more persons. States with 5 or more such units were: Michigan, 16; New York, 10; Pennsylvania, 9; Ohio, 8; Illinois, 7; California, 6; Indiana, 5. The 74 units employed 1,161,488 persons.

⁴ Includes data for employment on vessels not classified by State.

Source: Klem, Margaret C., McKiever, Margaret F., and Lear, Walter J., M.D.: *Industrial Health and Medical Programs* (P.H.S. Publication No. 15). Washington, Government Printing Office, 1950, pp. 44–45.

Table 3.—Distribution of manufacturing establishments and of employees, by size of establishment, 1950 and 1947¹

Employee size class	Number of establishments		Number of employees		Percent of establishments		Percent of employees	
	1950	1947	1950	1947	1950	1947	1950	1947
Total.....	247,307	240,881	14,370	14,294	100.0	100.0	100.0	100.0
1-249.....	236,891	230,662	5,896	5,807	95.8	95.8	41.0	40.6
250-499.....	5,817	5,555	2,008	1,930	2.3	2.3	14.0	13.5
500-999.....	2,714	2,729	1,868	1,869	1.1	1.1	13.0	13.1
1,000-2,499.....	1,379	1,431	2,063	2,146	.6	.6	14.4	15.0
2,500 and over.....	506	504	2,534	2,542	.2	.2	17.6	17.8

¹ The 1950 data are preliminary estimates based on 1950 Annual Survey of Manufactures conducted by the Bureau of the Census in cooperation with the National Production Authority. The annual survey covers approximately 45,000 plants out of a total of more than 250,000. Included are all large plants, accounting for approximately two-thirds of the total operating manufacturing employment in the United States, and a representative sample of the much more numerous small plants. The survey estimates in above table have a standard error of 2 percent or less.

Source: Bureau of the Census. *1950 Annual Survey of Manufactures*. (Preliminary Report Series MAS-50-8.) Washington, The Bureau. January 10, 1952.

Table 4.—Average annual number of absences lasting 1 calendar day or longer due to sickness and injuries, annual number of days of disability per person, and average number of days per absence, by cause; experience in a public utility, 1946-50, inclusive.¹

Cause. (Numbers in parentheses are disease title numbers from International List of Causes of Death, 1939)	Annual number of absences per 1,000 persons				Annual number of days per person				Average number of days per absence				Number of absences ending during 1946-50				Number of days of disability			
	Males		Females		Males		Females		Males		Females		Males		Females		Males		Females	
	1,514.1	2,618.1	11.372	12.976	7.51	7.51	4.96	4.96	19.935	7.150	149.727	35.438	23,295	25	23,295	25	801	2,207	32,430	14,010
All disabilities...													298	988	25	295	23,295	25	801	2,207
Industrial injuries (169-195)	75.0	9.1	1.769	2.933	23.58	32.04	9.77	18.315	632	6,226	6,443	6,226	226	6,226	6,226	119,989	119,989	32,430	32,430	
Nonindustrial injuries (169-195)	48.0	82.8	1.489	1.808	10.19	6.55	4.70	11.180	315	6,899	6,899	6,899	32	6,899	6,899	119,989	119,989	32,430	32,430	
Sickness...	1,391.1	2,526.2	9.114	11.875	6,55	4.70	3.75	11.180	735	3,735	42,703	42,703	42,703	14	42,703	42,703	14,010	14,010	42,703	42,703
Respiratory diseases...	1,849.1	1,367.6	3.243	5.130	3.82	3.75	3.75	11.180	18	1,384	1,384	1,384	1	1,384	1,384	420	420	420	420	
Tuberculosis of respiratory system (13)	6.6	7	1.105	1.154	173.00	210.00	8	8	508	2,045	2,045	2,045	2	508	508	8,507	8,507	2,845	2,845	
Influenza, grippé (33)	155.3	186.0	1.646	1.042	4.16	5.60	2.50	7	590	2,460	2,460	2,460	2	590	590	19,380	19,380	6,148	6,148	
Colds, coryza (104a)	576.5	900.8	1.472	2.251	2.55	2.55	16.10	209	100	3,100	3,100	3,100	3	297	297	1,610	1,610	1,610	1,610	
Bronchitis, acute and chronic (106)...	15.9	36.6	2.250	5.89	15.78	16.10	209	100	94	13	13	13	13	87	87	3,166	3,166	1,610	1,610	
Pneumonia, all forms (107-109)	7.1	4.8	1.241	1.175	33.68	36.85	3.35	3.35	887	546	546	546	3	467	467	1,829	1,829	1,829	1,829	
Diseases of pharynx and tonsils (115b, 115c)...	67.4	199.9	1.263	1.670	3.91	3.91	6.41	6.41	347	1,798	1,798	1,798	1	502	502	3,502	3,502	6,679	6,679	
Other respiratory diseases (104b, 105, 110-114)	26.3	38.8	1.266	1.249	10.09	10.09	6.41	6.41	347	4,006	4,006	4,006	4	2245	2245	6,014	6,014	6,014	6,014	
Digestive diseases...	304.3	658.4	1.690	2.202	5.55	3.34	4.006	4.006	450	1,234	1,234	1,234	1	450	450	4,006	4,006	422	422	
Diseases of teeth and gums (115a, 115d)	34.2	67.4	0.094	1.54	2.74	2.29	2.29	2.29	2,29	1,280	1,280	1,280	1	675	675	2,280	2,280	2,280	2,280	
Diseases of stomach except cancer (117, 118)...	203.2	468.7	1.731	1.947	3.60	2.02	2.02	2.02	2,02	2,675	2,675	2,675	2	675	675	5,629	5,629	5,629	5,629	
Diarrhea and enteritis (120)...	47.7	90.5	1.197	2.666	4.12	2.94	2.94	2.94	2,94	628	628	628	2	588	588	726	726	726	726	
Appendicitis (121)...	4.4	12.8	1.146	1.329	3.12	2.57	2.57	2.57	2.57	58	58	58	3	921	921	900	900	900	900	
Hernia (122a)...	5.6	2.2	0.277	0.600	4.23	2.17	2.17	2.17	2.17	74	74	74	6	643	643	1,633	1,633	1,633	1,633	
Other digestive diseases (116, 112b-129)	9.2	16.8	1.245	1.446	26.69	26.46	26.46	26.46	26.46	121	121	121	46	3,230	3,230	1,217	1,217	1,217	1,217	
Nonrespiratory-nondigestive diseases...	205.5	402.1	4.085	4.234	19.88	10.53	10.53	10.53	10.53	2,705	1,098	1,098	1	782	782	11,562	11,562	11,562	11,562	
Infectious and parasitic diseases (1-12, 14-32, 34-44)	24.8	23.1	1.240	1.294	9.70	12.73	12.73	12.73	12.73	326	63	63	3	162	162	802	802	802	802	
Rheumatism, acute and chronic (58, 59)	6.5	6.6	1.306	1.098	46.88	14.83	14.83	14.83	14.83	86	18	18	4	4,032	4,032	267	267	267	267	
Neurasthenia and the like (part of 84d)...	7.1	26.7	1.295	1.533	41.71	19.93	19.93	19.93	19.93	93	73	73	3	879	879	1,455	1,455	1,455	1,455	
Neuralgia, neuritis, sciatica (87b)...	8.0	15.4	1.145	1.088	18.16	5.74	5.74	5.74	5.74	105	42	42	1	907	907	241	241	241	241	
Other diseases of nervous system (80-85, 87 except part of 84d, and 87b)...	8.3	30.8	1.318	1.419	38.48	13.63	13.63	13.63	13.63	109	84	84	4	194	194	1,145	1,145	1,145	1,145	
Diseases of organs of vision (88)...	7.7	20.9	1.095	1.098	12.27	4.68	4.68	4.68	4.68	102	57	57	1	252	252	267	267	267	267	
Diseases of ears and mastoid process (89)...	10.3	22.0	1.059	1.165	5.68	7.50	7.50	7.50	7.50	136	60	60	6	772	772	450	450	450	450	
Diseases of heart and arteries (90-99)...	14.2	4.0	1.901	1.149	63.41	37.09	37.09	37.09	37.09	187	11	11	11	857	857	408	408	408	408	
Diseases of circulatory system (100-103)...	15.3	19.4	1.355	1.391	23.29	20.15	20.15	20.15	20.15	201	53	53	53	4,681	4,681	1,068	1,068	1,068	1,068	
Diseases of genitourinary system (130-138, part of 139)...	11.8	22.3	1.300	1.480	25.51	21.51	21.51	21.51	21.51	155	61	61	61	3,954	3,954	1,316	1,316	1,316	1,316	
Diseases of skin (151-153)...	17.5	20.1	1.166	1.139	9.45	8.84	8.84	8.84	8.84	231	55	55	55	264	264	380	380	380	380	
Diseases of organs of movement except diseases of joints (156b)...	54.0	63.3	1.386	1.390	7.14	6.15	6.15	6.15	6.15	711	173	173	173	5,077	5,077	1,064	1,064	1,064	1,064	
All other diseases (45-57, 60-79, 140-150, 154, 155, 156a, 157, 162)...	20.0	30.8	1.519	1.812	25.98	26.39	26.39	26.39	26.39	263	84	84	84	6,832	6,832	2,217	2,217	2,217	2,217	
III-defined and unknown causes (200)...	32.2	98.1	1.096	1.309	2.97	3.15	3.15	3.15	3.15	424	268	268	268	1,259	1,259	844	844	844	844	

Source: Gafaer, William M., D.Sc.: Washington, U. S. Public Health Service, Division of Occupational Health, 1952. Unpublished data.

¹The number of days of disability is the number of calendar days from the date disability began to the date of return to work, or to the 372nd day, inclusive. Number of person-years of exposure: Males, 13,166; females, 2,731.

Table 5.—Annual number of absences lasting 1 calendar day or longer due to sickness and injuries, by sex, according to duration; experience in a public utility, 1946–50, inclusive

Duration of absence in calendar days ¹	Injury and sickness	Injury		Total sickness	Sickness		
		Industrial	Non-industrial		Respiratory diseases	Digestive diseases	Nonrespiratory nondigestive diseases ²
Annual number of absences per 1,000 males							
All durations.	1,514.1	75.0	48.0	1,391.1	849.1	304.3	237.7
1	604.9	11.3	14.7	578.9	337.9	170.1	70.9
2	208.7	5.6	6.2	196.9	142.1	32.1	22.7
3	241.8	8.3	6.2	227.3	153.0	45.9	28.4
4	106.5	5.5	2.4	98.6	70.5	12.7	15.4
5	66.4	4.2	2.6	59.6	40.5	7.7	11.4
6	49.4	4.2	1.2	44.0	29.5	4.6	9.9
7	42.2	2.2	2.4	37.6	23.1	3.9	10.6
8-14	72.0	11.3	5.2	55.5	29.0	5.6	20.9
15-28	45.7	8.9	3.5	33.3	13.1	5.3	14.9
29-49	33.4	5.6	1.9	25.9	4.7	8.7	12.5
50-98	26.0	4.2	1.2	20.6	4.2	5.9	10.5
99-189	10.0	1.8	.1	8.1	.9	1.6	5.6
190-371	4.5	.9	.2	3.4	.3	.1	3.0
372	2.6	1.0	.2	1.4	.3	.1	1.0
Annual number of absences per 1,000 females							
All durations.	2,618.1	9.1	82.8	2,526.2	1,367.6	658.4	500.2
1	1,254.5	1.8	27.5	1,225.2	600.5	394.0	230.7
2	323.0	.7	10.3	312.0	198.1	62.6	51.3
3	460.3	1.8	14.7	443.8	247.2	122.3	74.3
4	141.3	.4	4.0	136.9	91.1	29.3	16.5
5	91.9	.4	2.5	89.0	58.6	14.3	16.1
6	57.1	.7	2.2	54.2	38.5	5.1	10.6
7	58.2	.7	5.1	52.4	34.1	5.5	12.8
8-14	83.9	.4	5.5	78.0	51.3	6.6	20.1
15-28	69.2	.4	5.1	63.7	31.1	3.3	29.3
29-49	45.0	.7	2.9	41.4	12.4	10.3	18.7
50-98	21.2	.4	1.8	19.0	3.3	4.0	11.7
99-189	9.2		.8	8.4	.7	.7	7.0
190-371	2.2	.7	.4	1.1		.4	.7
372	1.1			1.1	.7		.4

¹ Number of calendar days from the date disability began to the date of return to work, or to the 372nd day, inclusive.

² Ill-defined and unknown causes are included.

Number of person-years of exposure: Males, 13,166; females, 2,731.

Source: Gafafer, William M., D.Sc.: Washington, U. S. Public Health Service, Division of Occupational Health, 1952. Unpublished data.

Table 6.—Percentage distribution of disabled persons in the civilian non-institutional population, 14 to 64 years of age, by duration of disability prior to day of visit, United States, February 1949¹

Age (by years) and sex	Number disabled (in thousands)	Percentage distribution by duration of disability								
		Total	Not over 1 week	Over 1 week but not over 1 month	Over 1 month but not over 3 months	Over 3 months but not over 6 months	Over 6 months but not over 1 year	Over 1 year but less than 10 years	10 years and over	Duration not reported
Both sexes (14 to 64)	4,569	100	24.8	15.1	8.6	5.4	8.9	22.5	13.6	1.2
14 to 19	387	100	52.2	9.8	6.2	3.9	4.1	5.9	17.5	.5
20 to 24	364	100	38.8	15.8	11.2	3.8	2.5	11.2	15.8	.8
25 to 34	650	100	31.6	18.9	8.0	3.8	7.2	18.1	10.9	1.5
35 to 44	797	100	26.7	20.1	9.0	6.5	7.1	18.7	10.9	1.0
45 to 54	1,044	100	19.4	16.0	9.4	5.2	12.1	25.3	11.4	1.3
55 to 64	1,330	100	12.6	11.0	8.1	6.6	11.4	32.6	16.5	1.1
Male (14 to 64)	2,341	100	17.7	12.5	8.3	6.0	10.9	29.0	14.4	1.2
14 to 19	196	100	50.3	6.1	6.1	3.6	7.1	4.6	21.3	1.0
20 to 24	150	100	29.5	13.4	8.1	3.4	3.4	20.8	21.5	—
25 to 34	274	100	20.0	11.3	8.7	5.1	9.8	31.6	11.6	1.8
35 to 44	366	100	22.3	17.2	7.9	7.1	9.8	24.0	11.2	.5
45 to 54	566	100	13.2	14.6	10.8	6.0	11.1	31.6	11.1	1.6
55 to 64	791	100	7.7	10.5	7.1	7.1	14.0	36.2	16.2	1.3
Female (14 to 64)	2,228	100	32.1	17.9	9.0	4.7	6.7	15.7	12.7	1.2
14 to 19	191	100	54.2	13.5	6.2	4.2	1.0	7.3	13.5	—
20 to 24	214	100	45.2	17.5	13.4	4.1	1.8	4.6	12.0	1.4
25 to 34	376	100	40.1	24.4	7.4	2.9	5.3	8.2	10.3	1.3
35 to 44	431	100	30.4	22.5	10.0	6.0	4.9	14.2	10.7	1.4
45 to 54	478	100	26.8	17.6	7.7	4.2	13.2	17.8	11.7	1.0
55 to 64	539	100	19.7	11.7	9.6	5.9	7.6	27.5	17.1	.9

¹ Estimates are based on the Census Bureau's Current Population Survey for February 1949, covering approximately 25,000 households in 68 sample areas in 42 States and the District of Columbia.

Source: Woolsey, Theodore D.: *Estimates of Disabling Illness Prevalence in the United States*, Public Health Reports, 65:163-184 (Feb. 10), 1950.

Table 7.—Annual rate of absenteeism among male and female employees for two companies, subscribing to the New Haven Industrial Medical Service, 1944 and 1945¹

Reason for absence	Year	Average annual number of absences per 1,000 employees				Average annual number of days absent per employee				Average number of days lost per absence			
		S-S Co.		S-N Co.		S-S Co.		S-N Co.		S-S Co.		S-N Co.	
		M	F	M	F	M	F	M	F	M	F	M	F
All reasons	{ 1944	2,000	5,500	5,700	9,400	4.1	10.3	9.3	18.6	2.0	1.9	1.6	2.0
	1945	1,700	4,100	6,200	6,300	3.3	9.2	9.0	9.9	1.9	2.3	1.4	1.6
Sickness and non-industrial injuries	{ 1944	1,300	2,900	2,700	4,800	2.6	5.6	5.0	7.2	1.9	1.9	1.9	1.5
	1945	1,200	2,500	3,200	3,400	2.5	5.8	5.7	5.6	2.1	2.3	1.8	1.7
All other reasons	{ 1944	700	2,600	3,000	4,600	1.5	4.7	4.3	11.4	2.1	1.8	1.5	2.5
	1945	500	1,600	3,000	2,900	0.8	3.4	3.3	4.3	1.6	2.3	1.1	1.5

¹ All absences lasting one-half working day or longer are included.

Source: Meigs, J. Wister, M.D.: Illness and Injury Rates in Small Industrial Plants. *Occupational Medicine*, 5:21 (January) 1948.

Table 8.—Estimated number of disabling work injuries¹ and resulting time lost, United States, 1937-50

Period	Number of disabling injuries	Man-days lost	
		In year of injury	In subsequent years (economic loss)
1937	1,838,000	(2)	(2)
1938	1,375,600	(2)	(2)
1939	1,603,500	(2)	(2)
1940	1,889,700	41,912,000	191,928,000
1941	2,180,200	42,083,000	209,000,000
1942	2,267,700	53,000,000	210,000,000
1943	2,414,000	56,800,000	217,200,000
1944	2,230,400	43,614,400	179,329,600
1945	2,019,800	45,600,000	185,664,000
1946	2,056,000	42,750,000	187,250,000
1947	2,059,000	44,700,000	189,000,000
1948	2,019,900	41,000,000	178,000,000
1949	1,870,000	39,000,000	165,000,000
1950	1,952,000	40,000,000	172,000,000

¹ A disabling work injury is an injury arising out of and in the course of employment, which results in death or any degree of permanent impairment, or makes the injured worker unable to perform the duties of a regularly established job, open and available to him, throughout the hours corresponding to his regular shift on any one or more days (including Sundays, days off, or plant shutdowns) after the day of injury.

The estimates include injuries to all employees, self-employed, and unpaid family workers in agricultural and all other industries except domestic service.

² Not available.

Source: U. S. Department of Labor, Bureau of Labor Statistics: *Handbook of Labor Statistics, 1950 Edition (Bulletin No. 1016)*. Washington, U. S. Government Printing Office, 1951. p. 177.

Table 9.—Work-injury frequency rates and indexes of work-injury frequency rates (manufacturing), by extent of disability, United States, 1926-49¹

Period	Injury frequency rates ²	Index of frequency rates (1926 = 100) ³				Period	Injury frequency rates ²	Index of frequency rates (1926 = 100) ³			
		All injuries	Death and permanent total	Permanent partial	Temporary total			All injuries	Death and permanent total	Permanent partial	Temporary total
1926	24.2	100.0	100.0	100.0	100.0	1939	14.9	73.4	71.4	80.7	73.9
1927	22.6	93.6	107.1	96.3	93.3	1940	15.3	75.3	71.4	84.8	75.6
1928	22.5	93.2	107.1	104.6	92.5	1941	18.1	85.8	80.3	93.7	86.2
1929	24.0	99.2	92.9	109.2	98.7	1942	19.9	93.5	70.7	83.4	94.1
1930	23.1	95.5	107.1	111.0	94.6	1943	20.0	94.4	70.7	83.4	95.0
1931	18.9	78.0	92.9	102.8	76.5	1944	18.4	88.3	62.8	75.4	89.7
1932	19.6	80.9	107.1	113.8	78.9	1945	18.6	81.9	62.8	72.3	83.0
1933	19.3	91.8	85.7	110.1	90.8	1946	19.9	84.3	60.1	77.9	85.3
1934	20.2	93.6	107.1	128.4	91.6	1947	18.8	78.4	51.7	70.1	79.3
1935	17.9	88.1	92.9	121.1	86.2	1948	17.2	69.8	51.7	67.3	70.6
1936	16.6	85.7	85.7	114.7	84.1	1949	15.0	61.2	44.3	61.9	61.6
1937	17.8	85.8	85.7	122.0	83.7	1950					
1938	15.1	71.7	71.4	78.9	68.1						

¹ Prior to 1936 the coverage in the Bureau surveys was limited to wage earners in 30 industry classifications. Starting in 1936 the coverage was extended to include all employees in all types of manufacturing.

² The frequency rates shown (average number of disabling injuries for each million employee-hours worked) represent the combined experience of all reporting establishments in each year. Prior to 1936 the frequency rates were unweighted. From 1936 on, the all-manufacturing rates have been weighted averages. In their computation the current procedure is to weight the frequency rate for each industry classification by the estimated total employment in that industry.

³ Prior to 1937 the index numbers represent the change in the frequency rate of the entire reporting sample for each year as related to the base year, 1926. Because of the substantial expansion of the sample in 1936 and in subsequent years this procedure was changed. Beginning with 1937, the indexes have been computed by chain-link methods, using the percentage of change in the frequency rates for identical establishments in each pair of successive years. The index changes, therefore, do not necessarily correspond with the changes in the all-manufacturing frequency rates shown in the table.

Source: U. S. Department of Labor, Bureau of Labor Statistics: *Handbook of Labor Statistics, 1950 Edition (Bulletin No. 1016)*. Washington, U. S. Government Printing Office, 1951. p. 179.

Table 10.—Estimated number of persons eligible for specific health and disability benefits through voluntary programs, by type of program, United States, Dec. 31, 1951¹

Type of program	Number of persons eligible for medical and hospital benefits (in thousands)		
	Hospital	Surgical	Medical
Total coverage.....	92,701	69,656	29,314
Deduction for estimated duplication.....	6,710	4,121	1,591
Estimated total persons eligible.....	85,991	65,535	27,723
Group insurance, total.....	26,663	26,376	7,946
Subscribers.....	12,132	12,586	4,530
Dependents.....	14,531	13,790	3,416
Individual insurance, total.....	21,574	16,395	4,230
Subscribers.....	9,966	7,055	2,186
Dependents.....	11,608	9,340	2,044
Blue Cross plans and plans sponsored by medical societies.....	40,933	24,095	14,347
Subscribers.....	17,258	10,339	6,336
Dependents.....	23,675	13,756	8,011
Independent plans, total.....	3,531	2,790	2,791
Industrial.....	2,200	1,900	2,000
Community.....	592	119	48
Consumer.....	300	290	262
Private group clinics.....	339	381	381
University health plans.....	100	100	100
Number of persons eligible for disability benefits (in thousands)			
Total coverage.....		41,944	
Deduction for estimated duplication.....		2,242	
Estimated total persons insured.....		39,702	
Group insurance.....		17,992	
Individual insurance.....		13,452	
Paid sick leave:			
In private industry.....		4,000	
In civilian government service.....		4,300	
Employee mutual benefit associations.....		1,000	
Union plans and other employer-employee methods.....		1,200	

¹ Since the purpose of this survey is to measure the extent and growth of coverage under employer-employee and other voluntary programs, individuals covered solely by Government insurance under compulsory plans have not been included in the total number of persons protected against loss of income due to disability. Also omitted from the survey are the following types of protection: Workmen's compensation providing protection to the majority of wage earners against occupational accidents and diseases; total and permanent disability benefits included in many life insurance policies; commercial accident policies providing disability indemnity and other benefits in event of accidental injuries; group accidental death and dismemberment insurance; commercial accident policies covering travel hazard; complete medical care for persons in the Armed Forces; complete medical care for persons in public institutions; medical care and disability pensions available under certain conditions to war veterans; protection under automobile and all other types of personal injury liability policies; and medical payment provisions under many automobile, residence liability, and other types of liability policies.

Source: The Survey Committee of the Health Insurance Council: *A Survey of Accident and Health Coverage in the United States*. New York, The Council, 1952, pp. 11, 15.

Table 11.—Distribution of members in 149 industrial plans providing physician's services or hospitalization, by type of medical care and type of plan, Dec. 31, 1949

Type of medical care	Plan membership by type of financing					
	Total	Employer	Employee	Employer-employee	Employer-union	Union
Total membership.....	1,970,037	233,796	868,111	410,585	23,894	433,651
Physicians' and surgeons' services in home, office (or clinic) and hospital.....	1,217,004	127,579	529,645	380,221	17,894	161,665
Physicians' services in home and office (or clinic).....	277,490	.....	1,962	4,827	6,000	264,701
Surgeons' services only (including maternity).....	220,941	35,199	160,262	25,480	.....	.....
Hospitalization benefits in connection with physicians' services.....	1,614,841	160,128	681,379	382,372	17,894	373,068
Hospitalization benefits only.....	254,602	71,018	176,242	57	.....	7,285

Source: Brewster, Agnes W.: *Independent Plants Providing Medical Care and Hospitalization Insurance in the United States in 1949* (Bureau Memorandum No. 72). Washington, U. S. Government Printing Office, 1952. p. 26.

Exhibit 1.—Suggested principles for lay-sponsored voluntary health plans, American Medical Association

1. The plan shall be nonprofit, paying no dividends to beneficiaries or others; all surplus earnings shall be devoted either to improving the services, to making compensation of physicians and other staff members more adequate for their responsibilities and services, to purchasing facilities and equipment, to increasing the scope of benefits, or to building adequate reserve funds. All income to the plan shall be devoted to services for beneficiaries.

2. The plan shall comply with the Principles of Medical Ethics of the American Medical Association, which provide that it is unprofessional for a physician to dispose of his professional attainments or services to any lay body, organization, group or individual, by whatever name called, or however organized, under terms or conditions which permit a direct profit from the fees, salary, or compensation received to accrue to the lay body or individual employing him.

3. If incorporated, the plan shall be adequately financed and organized without capital stock.

4. The plan shall be operated under an autonomous administration or trust, with segregated funds, and shall be devoted exclusively to the provision of health services.

5. Promotion, sales, organization, and administrative expense of the plan shall be kept at a minimum as judged by the accrediting body.

6. The quality of medical service shall be maintained at the highest possible level. All participating physicians shall be doctors of medicine [duly licensed to practice medicine] in any State in which the plan operates. Each physician engaged in the practice of a specialty shall be required to have adequate qualifications for that specialty. The personnel and facilities of the plan shall be adequate to insure a high quality of medical care.

7. The plan shall provide all services as set forth in the agreement with the beneficiary. When, in the opinion of the medical staff, a professional service set forth is not available because of an emergency or because of the need for highly technical procedure, or for any other reason, then such service shall be otherwise provided by the plan.

8. The plan, in its agreement entered into with the beneficiary and which shall be distributed to each beneficiary, shall state clearly the services and benefits to be

provided and the conditions under which they will be provided. All exclusions, limitations, waiting periods, and deductible provisions shall be clearly stated in the agreement with the beneficiary and in promotional and descriptive literature.

9. The plan shall, in its agreement with the beneficiary, state clearly the amount of dues or subscriptions to be paid. The amount of dues or subscription shall be adequate to provide for the benefits and services offered and to insure proper financing of the risks involved.

10. No promotional material shall invite attention to the professional skill, qualifications, or attainments of the physicians participating in the plan.

11. Participating physicians may be compensated in any manner not contrary to the Principles of Medical Ethics of the American Medical Association relating to contract practice.

12. Any duly licensed physician in the community who wishes to participate in the plan, who meets its professional and personnel standards and who agrees to abide by its terms and the requirements of its beneficiaries shall be admitted to the plan.

13. The names of all participating physicians of the plan shall be made available to the prospective beneficiary. The beneficiary shall, within reasonable geographic and professional limitations, have free choice among participating physicians.

14. There shall be no interference by the governing body with the medical staff in the practice of medicine. The traditional and confidential relationship of the physician and patient shall be preserved.

15. Adequate provision shall be made for effective participation of the medical staff in the deliberations of the governing body. It is recommended that the membership of the governing body include representatives of the medical profession.

16. All services rendered by the participating physician, not included in the beneficiary's contract, shall be payable by the beneficiary to the participating physician on a fee-for-service basis.

17. The method of operation of any hospital owned or under contract to the plan shall be in accordance with sound public policy.

18. The plans shall provide for like rates, benefits, terms and conditions for all persons in the same class.

19. Investment of reserve funds shall be made only in securities deemed prudent for such purposes.

20. Any plan desiring approval under these principles shall agree to such periodic reviews and to abide by such regulations as may be deemed necessary by an appropriate accrediting body of the American Medical Association in consultation with representatives of the sponsors of the plan.

Source: American Medical Association, Council on Medical Service: Proceedings of the Atlantic City Session. *Journal of the American Medical Association*, 140: 686-7 (June 25), 799 (July 2) 1949.

Table 12.—Number of surveyed firms reporting on employee benefit programs, percent reporting specified type of program,¹ and percent of employees in reporting firms covered, by employee size class and by industry group¹

Item	Reporting firms		Life insurance plan		Pension and retirement plan		Hospitalization plan		Surgical plan		Medical care plan	
	Number of employees	Firms having	Employees covered	Firms having	Employees covered	Firms having	Employees covered	Firms having	Employees covered	Firms having	Percent 12.7	Percent 8.4
All firms	6,845	2,478,137	Percent 62.4	Percent 75.0	Percent 29.7	Percent 40.7	Percent 75.7	Percent 70.9	Percent 46.7	Percent 49.0	Percent 12.7	Percent 8.4
Employee size class:												
1 to 99	4,292	136,765	49.7	49.9	19.2	15.8	66.5	62.2	37.5	38.3	11.6	12.3
100 to 499	1,788	395,859	80.3	64.8	40.0	23.2	89.0	69.2	58.6	45.8	14.3	17.0
500 to 999	335	230,336	88.8	71.3	55.5	31.2	95.5	71.6	71.3	51.9	16.7	12.6
1,000 and over	430	1,715,177	93.3	79.8	72.8	48.0	97.4	71.9	70.7	50.3	13.5	7.0
Industry group:												
Manufacturing	3,085	1,676,295	69.7	78.7	31.6	34.3	82.8	71.4	52.9	54.5	14.2	7.3
Trade, retail and wholesale	1,877	315,272	56.7	59.2	23.7	39.4	71.4	70.6	41.1	35.2	11.4	6.9
Finance, insurance, real estate	688	94,647	70.8	79.6	48.5	56.8	77.0	77.0	50.4	55.7	14.2	12.9
Transportation, communication, utilities	265	266,555	78.9	82.6	42.3	85.0	81.9	74.2	61.1	40.2	17.0	15.4
Service	648	79,973	40.3	51.7	19.8	21.4	59.3	55.9	49.0	31.8	7.6	12.3
Construction	272	30,839	33.5	34.6	13.6	18.4	55.9	49.0	28.7	18.0	7.0	3.3
Mining	10	14,556	50.0	32.3	50.0	36.8	60.0	46.1	30.0	4.5	20.0	1.7

¹ Based on surveys of employee benefit plans conducted separately in the following 12 metropolitan areas which included a sixth of the total United States population: Atlanta, Chicago, Cleveland, Detroit, Houston, Indianapolis, Minneapolis-St. Paul, Philadelphia, Pittsburgh, St. Louis, Salt Lake City, San Francisco. Of the firms contacted 34.7 percent returned questionnaires. Employment in these firms was 27.4 percent of the nonagricultural employment in the 12 areas.

Source: Research Council for Economic Security: *Employee Benefit Plans: Nationwide Survey, Twelve Metropolitan Areas (Publication No. 69)*. Chicago, The Council, 1950, pp. 9-23.

Table 13.—*Workmen's compensation coverage of occupational diseases, by State and type of coverage, January 1, 1952*

Full coverage	Schedule coverage		No coverage
	Jurisdiction	Number of diseases ¹	
Alaska.....	Alabama.....	(²)	Kansas.....
Arkansas.....	Arizona.....	36	Louisiana.....
California.....	Colorado.....	24	Mississippi.....
Connecticut.....	Georgia.....	14	Oklahoma.....
Delaware.....	Idaho.....	11	Wyoming.....
District of Columbia.....	Iowa.....	16	
Florida.....	Kentucky.....	(³)	
Hawaii.....	Maine.....	14	
Illinois.....	Montana.....	(⁴)	
Indiana.....	New Hampshire.....	(⁵)	
Maryland.....	New Mexico.....	31	
Massachusetts.....	North Carolina.....	25	
Michigan.....	Pennsylvania.....	13	
Minnesota.....	Puerto Rico.....	17	
Missouri.....	South Dakota.....	25	
Nebraska.....	Tennessee.....	(⁶) 9	
Nevada.....	Texas.....	45	
New Jersey.....	Vermont.....	7	
New York.....	Virginia.....	(⁶) 46	
North Dakota.....			
Ohio.....			
Oregon.....			
Rhode Island.....			
South Carolina.....			
Utah.....			
Washington.....			
West Virginia.....			
Wisconsin.....			
United States:			
Civil Employees.....			
Longshoremen's Act.....			

¹ In some States, the number of diseases refers to "groups of diseases."

² Covers pneumoconiosis, including silicosis, anthraco-tuberculosis, aluminosis, and other specified dust diseases.

³ Covers only injury or death by gas or smoke in mines and poisonous gas in any occupation. Voluntary as to silicosis.

⁴ Separate act provides for payment of \$50 a month from public funds to persons totally disabled from silicosis, if they have been State residents for 10 years.

⁵ Covers silicosis and other pulmonary diseases, anthrax, lead poisoning, dermatitis, venenata, and diseases due to the inhalation of poisonous gases or fumes.

⁶ Full coverage permissible.

Source: Greene, Bruce A.: State Workmen's Compensation Legislation in 1951. *Monthly Labor Review*, 74:18 (January) 1952.

Table 14.—Total number of physicians specializing in industrial medicine, and number of registered graduate nurses employed full time in industry, United States, 1950

State	Number of physicians in industrial practice ¹		Number reporting on type of service rendered				
	Limiting practice	Giving special attention	Total nurses employed	In-plant	Home or visiting nurse	Industrial hospital	Personnel department
United States ²	940	1,091	10,704	6,892	197	370	76
Alabama	15	8	134				
Arizona	7	6	35	3	1	31	0
Arkansas	2	3	19	14	0	5	0
California	72	86	618				
Colorado	12	11	46	22	2	17	3
Connecticut	30	13	441	429	9	0	3
Delaware	12	3	45	31	0	14	0
District of Columbia	2	5	258				
Florida	4	8	56				
Georgia	8	10	145	136	3	6	0
Idaho	0	1	3	3			
Illinois	126	153	1,300	398	14	0	0
Indiana	17	34	439	414	9	15	1
Iowa	7	13	99	80	6	0	0
Kansas	1	9	71	55	0	0	0
Kentucky	8	20	90				
Louisiana	7	11	102	56	5	34	7
Maine	1	7	55	36	3	16	0
Maryland	24	8					
Massachusetts	28	30	634	606	14	2	12
Michigan	85	53	838	822	12	2	2
Minnesota	2	12	172	145	6	17	2
Mississippi	0	3	44	28	0	15	1
Missouri	20	33	271	265	5	0	1
Montana	0	1	1		1		
Nebraska	2	6	43	39	0	4	0
Nevada	1	2	11	3	0	8	0
New Hampshire	0	1	36	35	0	0	1
New Jersey	50	60	750	129	11	4	8
New Mexico	1	2	11	0	0	11	0
New York	133	130	685	674	10	0	1
North Carolina	4	6	121				
North Dakota	0	1	0	0	0	0	0
Ohio	65	61	487	340	16	125	6
Oklahoma	15	13	46	45	1	0	0
Oregon	2	8	57	54	0	3	0
Pennsylvania	74	81	1,034	837	8	1	10
Rhode Island	1	6	83	83	0	0	0
South Carolina	0	4	130	109	11	7	3
South Dakota	0	2	3	2	1	0	0
Tennessee	17	13	241	231	8	0	2
Texas	21	44	154	118	16	11	9
Utah	0	14	34				
Vermont	1	3	22	18	0	3	1
Virginia	24	18	89				
Washington	6	19	107	100	1	6	0
West Virginia	22	15	171	134	23	13	1
Wisconsin	11	37	429	393	1	0	2
Wyoming	0	4	5	5	0	0	0

¹ Based on personal data furnished by the physicians where bibliographical information fulfilled the requirements for such a listing in the Directory.

² Total includes 39 nurses serving in two or more States.

Source: Cargill, Frank V., Editor: *American Medical Directory*. Chicago, American Medical Association, 1950, pp. 12-13, and reports compiled by the Directory staff; and U. S. Public Health Service, Division of Industrial Hygiene: Reported Number of Registered Nurses Employed Full Time by Industry in the United States and Territories, According to Education and Experience, as of Jan. 1, 1950.

Table 15.—Percent of employees eligible for specified services in industries classified according to size, Chicago-Cook County Survey, 1946¹

Service	All plants	Size class (number of employees)					
		1-100	101-250	251-500	501-1,000	1,001-2,500	2,500 and over
Number of plants surveyed.....	1,399	698	347	148	107	63	36
Number of employees.....	594,455	31,430	56,519	52,546	72,293	95,481	286,186
Percent of employees eligible for service							
Physician:							
Full-time.....	30.9			0.5	1.0	13.7	59.3
Part-time.....	51.6	0.3	5.1	9.2	21.2	39.1	86.0
On call.....	42.8	34.2	48.5	59.5	70.7	62.3	25.9
Registered graduate nurse:							
Full-time.....	72.7	.3	10.2	39.0	62.2	91.9	95.5
Part-time.....	3.6	.3	1.0	2.9	5.9	1.1	4.8
On call.....	4.5	1.6	2.9	6.0	9.9	4.7	3.5
Dentist:							
Full-time.....	1.5						3.1
Part-time.....	5.3		.7	1.4			10.5
On call.....	1.6	.5	1.6	2.1	2.7	5.7	-----
Industrial hygienist:							
Full-time.....	2.8			.6		1.5	5.2
Part-time.....	2.5	.2	.3		2.2	3.6	3.4
On call.....	1.4		1.1	3.5	2.6	4.3	-----
Safety engineer:							
Full-time.....	49.7	5.2	11.1	27.1	29.4	72.2	64.0
Part-time.....	10.2	6.0	12.8	15.8	22.3	8.1	6.7
On call.....	3.4	2.2	7.2	11.8	10.1	2.2	-----

¹ Based on a survey conducted by the U. S. Public Health Service. The 594,455 employees in survey industries represented 37 percent of the gainfully employed persons in the Chicago-Cook County area.

Source: Flinn, Robert H., M.D.: In *The Chicago-Cook County Health Survey*. New York, Columbia University Press, 1949, pp. 639, 659.

Table 16.—Percent of plants in each specified size group having services of physician or nurse and number of physicians and nurses serving plants, State of Pennsylvania, 1951

Size group (number of employees)	Number of plants	Percent of plants having service of			Number serving plants		
		Physician		Registered graduate nurse	Physician		Registered graduate nurse
		Full time	Part time		Full time	Part time	
All plants ¹	21,399	0.3	1.1	2.3	89	² 278	1,082
Less than 500.....	20,853	(³)	.4	.8	2	91	216
500-1,000.....	282	2.8	18.8	46.8	8	55	203
1,001-2,000.....	139	10.1	37.4	64.7	14	54	219
2,001-5,000.....	95	16.8	40.0	76.8	19	51	292
5,001 and over.....	30	76.7	46.7	80.0	46	27	152

¹ Excludes commercial and merchandising establishments; full data was not available on such establishments, but 27 of them employed 69 full-time nurses.

² Includes 8 part-time nurses employed in plants with less than 500 employees and 1 part-time nurse in a plant with from 500 to 1,000 employees.

³ Less than 0.05 of 1 percent.

Source: Hickey, Frances C., R.N., and Lembright, Katherine A., R.N., Pennsylvania Department of Health, Bureau of Industrial Hygiene. Unpublished data. 1951.

Table 17.—Number and percent of employees, in plants of specified type, eligible for services by a physician or nurse, State of Pennsylvania, 1951

Type of plant	Number of employees in plants	Number eligible for services by—		Percent eligible for services by—	
		Full- or part-time physician	Industrial nurse	Full- or part-time physician	Industrial nurse
All plants ¹	1,808,817	592,186	709,182	32.7	39.2
Chemical and allied products.....	56,399	39,315	23,925	69.7	42.4
Clay, glass, and stone products.....	68,890	5,956	23,571	8.6	34.2
Food and kindred products.....	118,668	27,901	21,467	23.6	18.1
Leather and rubber goods.....	48,022	8,142	12,139	16.9	25.3
Lumber and its remanufacture.....	37,682		145	.4	
Metals and metal products.....	716,378	417,724	499,782	58.3	69.7
Mine and quarry products.....	188,428	2,339	3,410	1.2	1.8
Paper and printing industries.....	94,634	30,817	15,469	32.6	16.3
Textiles and textile products.....	321,109	27,043	33,452	8.4	10.4
Tobacco and its products.....	19,919	7,132	10,094	35.8	50.7
Miscellaneous products.....	87,897	7,928	40,812	9.0	46.4
Railroad repair shops.....	50,791	17,889	24,916	35.2	49.1

¹ Excludes commercial and merchandising establishments; full data were not available on such establishments but 27 of them employed 69 full-time nurses.

Source: Hickey, Frances C., R.N., and Lembright, Katherine A., R.N., Pennsylvania Department of Health, Bureau of Industrial Hygiene. Unpublished data. 1951.

Exhibit 2.—Educational institutions offering courses in industrial hygiene ¹

Courses for Physicians and Dentists

School of Public Health, University of California at Berkeley.

M. P. H. (one calendar year) and Dr. P. H. (2 years) open to physicians and others qualified. Special courses in industrial toxicology, sanitary air analysis, survey course in industrial health and hygiene, and a seminar in industrial health.

School of Public Health, University of California at Los Angeles.

Course in industrial health offered to physicians, nurses, public health students, and undergraduates; 30 hours with credit of two units.

School of Medicine and Institute of Occupational Medicine and Hygiene, Yale University, New Haven, Conn.

M. P. H. (1 year) and Dr. P. H. (1 to 2 years) with specialization in occupational health open to physicians. Course work in occupational health for senior medical students. Fellowship in occupational medicine for graduate physicians. Course in industrial toxicology for seniors and graduates.

College of Medicine, University of Illinois, Chicago.

Required course in industrial medicine for juniors; 12 lectures in winter and spring terms.

Indiana University School of Medicine, Department of Public Health, Bloomington.

Course in industrial medicine for junior medical students. Seniors spend 20 hours visiting plants.

College of Medicine, State University of Iowa, Iowa City.

Four courses dealing with industrial hygiene.

¹ The list was compiled from information submitted by the State and local industrial hygiene units and directly from the schools involved. It is not presented as a complete listing.

University of Louisville, School of Medicine, Department of Preventive Medicine and Public Health, Louisville, Ky.	Three-hour course in industrial medicine for junior medical students.
Postgraduate School of Public Health, Tulane University, New Orleans, La.	M. P. H. in public health with elective specialization in industrial health; 15 lectures and 7 field trips.
School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Md.	M. P. H. (one academic year) and Dr. P. H. (2 years) with electives in industrial hygiene open to physicians, nurses, and engineers.
University of Maryland, College Park.	Two-hour course in industrial hygiene education.
University of Massachusetts, Amherst.	Course in industrial hygiene for students in public health and sanitation.
School of Public Health, Graduate School of Engineering, Harvard University, Boston, Mass.	Courses in industrial hygiene open to physicians and engineers as part of public health program; may be applied toward M. P. H. or Dr. P. H. and S. M. or S. D.
School of Public Health, University of Michigan, Ann Arbor.	M. P. H. degree with study in industrial health offered to physicians, qualified engineers and administrative nurses.
University of Michigan, Extension Division, Detroit.	Fellowship program provides for one year at School of Public Health and one year at hospital and in association with a General Motors plant. Leads to M. P. H. degree.
College of Medicine, Wayne University, Detroit, Mich.	18 hours of work in industrial health for students in School of Medicine.
School of Public Health, University of Minnesota, Minneapolis.	Course in industrial hygiene and health, open to all qualified students, non-credit; two semester hours, given one semester a year.
School of Medicine, University of Buffalo, Buffalo, N. Y.	Course in industrial health for sophomores.
School of Public Health, Columbia University, New York, N. Y.	Course in industrial health programs—organization of services, State programs.
Institute of Industrial Medicine, Post-graduate Medical School, New York University-Bellevue Medical Center, New York, N. Y.	Fourth year students have 4 hours of lectures on industrial toxicology and a 3-hour symposium and field trip on industrial medicine.
	M. S. in industrial hygiene open to qualified physicians, nurses, engineers, and chemists. M. P. H. open to physicians and others with considerable previous experience in industrial hygiene and public health. Courses extend one calendar or academic year.
	One year graduate course for physicians and engineers. Short post-graduate courses on specified subjects. Under-graduate courses in the College of Medicine.

New York Postgraduate Medical School, New York, N. Y.

School of Public Health, University of North Carolina, Chapel Hill.

Institute of Industrial Health, University of Cincinnati, Cincinnati, Ohio.

School of Medicine, Western Reserve University, Cleveland, Ohio.

Jefferson Medical College, Philadelphia, Pa.

Woman's Medical College of Pennsylvania, Philadelphia.

School of Medicine, University of Pittsburgh, Pittsburgh, Pa.

Medical School, University of Utah, Salt Lake City.

University of Washington, Seattle.

Symposium on industrial medicine.

Elective courses in public health problems in industry.

Doctor of Industrial Medicine degree offered, 2-year training plus 1-year experience (limited number of fellowships offered to graduates of Class A medical schools who have completed 2 years of residency including internship in accredited hospital).

Course of environmental preventive medicine for sophomores; 8 hours of lectures, 24 of field demonstrations. Problems of environmental sanitation in communities and industries.

Graduate students in toxicology.

Course in industrial medicine for seniors; 36 hours, lectures and field trips.

Graduate course for physicians, leading to the degree of Doctor of Industrial Medicine.

Course in industrial medicine given for seniors; 1 hour in industrial hygiene laboratory and 22 hours of lectures.

Three-hour lecture course covering introduction to industrial hygiene and industrial toxicology offered to physicians, engineers, and chemists; elective for undergraduate medical, engineering, and chemistry students; required of industrial nurses.

Industrial hygiene and air pollution service laboratory established. Two or three graduate students from College of Engineering assigned for 1-year graduate training.

Courses for Nurses

School of Public Health, University of California at Berkeley.

University of California at Los Angeles.

School of Medicine and Institute of Occupational Medicine and Hygiene, Yale University, New Haven, Conn.

School of Public Health Nursing, Loyola University, Chicago, Ill.

Boston College, Boston, Mass.

(See listing under courses for physicians.)

B. S. degree with specialization in industrial nursing.

M. P. H. and M. S. open to nurses.

Three courses in the field of industrial nursing are offered during the academic year. Credit may be applied toward B. S. P. H. N.

Full program of studies in industrial nursing.

School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Md.	(See listing under courses for physicians.)
School of Public Health, University of Michigan, Ann Arbor.	(See listing under courses for physicians.)
School of Public Health, University of Minnesota, Minneapolis.	General courses related to industrial hygiene. May be applied toward B. S. B. S. in nursing education with major of 30 semester hours in industrial nursing.
Seton Hall College, South Orange, N. J.	(See listing under courses for physicians.)
School of Public Health, Columbia University, New York, N. Y.	Industrial nursing and industrial hygiene are part of major in public health nursing.
Teachers College, Columbia University, Division of Nursing Education, New York, N. Y.	Beginning in September 1951, elective courses in industrial nursing and industrial hygiene offered in the public health nursing program.
School of Nursing Education, St. John's University, Brooklyn, N. Y.	Course in industrial nursing practice offered.
School of Education, New York University, New York, N. Y.	B. S. degree in nursing education with a major in industrial nursing; 2-year course which includes two months of industrial field experience.
School of Nursing, University of Pittsburgh, Pittsburgh, Pa.	B. S. in industrial nursing offered graduate nurses, field work included.
University of Washington, Seattle.	

Source: Educational Opportunities in Industrial Hygiene. *Industrial Health Monthly*, 11: 84-87 (June) 1951.

Table 18.—Percent of surveyed companies in each size group reporting specified type of health program, 1950¹

Size group	Companies reporting in survey	Percent of companies reporting									
		In-plant medical services	Out-of-plant medical services	Health education programs	Accident-prevention programs	Medical personnel on safety committee	Mass X-ray	Cancer	Rh blood test	Syphilis	
All companies ²	3,589	55.8	84.8	40.7	73.5	26.2	50.9	5.9	9.7	10.9	
1-250	1,901	33.9	84.0	21.1	58.8	6.9	33.8	4.0	4.9	4.5	
251-500	617	69.5	86.2	54.3	85.4	30.4	66.5	5.3	11.5	11.6	
501-1,000	466	85.4	86.0	61.3	91.4	40.5	73.4	6.4	16.0	14.8	
1,001-2,500	356	90.7	86.2	73.2	96.3	35.0	71.5	8.2	17.3	24.5	
Over 2,500	200	96.5	83.2	80.2	98.0	47.8	71.4	19.8	21.1	35.2	

¹ Based on a 1951 survey of member companies made by the National Association of Manufacturers. The 3.3 million employees in the companies which responded to the questionnaire included factory, office and executive personnel and represented more than 22 percent of the average number of employees in manufacturing establishments during 1950.

² Total includes companies which did not report number of persons employed.

Source: Bachman, George W., D. Sc., and associates: *Health Resources in the United States, Availability of Personnel, Facilities, and Services*. Washington, Brookings Institution, 1952. In press.

Table 19.—Percent of manufacturing establishments and of employees, in each specified size group, with adequate physician and nurse service, State of New Jersey, 1945¹

Size group (number of employees)	Number		Percent with adequate physician service ²		Percent with adequate nurse service ²	
	Plants	Employees	Plants	Employees	Plants	Employees
All groups	1,237	674,106	14.0	59.7	30.0	79.2
1-100	396	20,724	.5	.7	1.0	1.4
101-250	405	66,733	5.2	5.5	13.3	14.8
251-500	195	71,223	16.9	17.5	52.3	54.4
501-1,000	118	83,082	35.6	37.1	81.3	82.6
1,001-5,000	98	210,186	59.2	63.3	89.8	92.4
5,001 and over	25	222,158	100.0	100.0	100.0	100.0

¹ Based on information obtained from almost every manufacturing establishment with more than 100 employees and a selected group of plants with less than 100 employees.

² Only plants reporting a full- or part-time physician were considered as having adequate physician service. All plants reporting registered or nongraduate nurse-trained first-aid workers, etc., were considered as having adequate nursing service.

Source: Radcliffe, J. C.: Industrial Health Facilities in New Jersey. *Public Health News*. (June) 1946

Table 20.—Percent of employees in plants, classified according to size, to whom specified health and medical services were available at the plant or elsewhere, Chicago-Cook County Survey, 1946¹

Type of service available	Size class (number of employees)		
	More than 100 employees	100 employees or less	
	Percent of employees eligible for service		
	At plant	Elsewhere	At plant
Number of plants surveyed.....	701		698
Number of employees in plants.....	563,025		31,430
Pre-employment physical examinations.....	58.1	24.8	0.5
Periodic physical examinations.....	46.9	10.9	2.0
Examination after an illness.....	57.9	12.4	
Chest X-ray examinations.....	37.0	15.8	.4
Tuberculosis surveys.....	25.2	8.2	.4
Blood tests for syphilis.....	37.2	24.1	1.3
Dental examinations and advice.....	14.7	4.2	.3
Dental X-ray examinations.....	13.1	5.2	
Special eye examinations.....	31.5	13.6	.9
Medical advice after examinations.....	61.2	7.9	.7
Placement of handicapped workers.....	74.9	.9	10.2
Treatment of plant injuries.....	81.7	17.1	3.6
Treatment of minor on-the-job illnesses.....	80.6	6.6	7.3
General medical care of employees.....	16.4	3.8	.3
Medical care of employees' families.....	2.0	1.5	.3
A continuing health education program.....	47.1	.3	1.3
Visiting nurse for sick absentees.....	44.9	3.4	.1
Plant health inspections by industrial physician.....	46.2	1.7	2.7
Accident records.....	95.3	1.4	61.7
Illness records.....	79.6	.6	18.4
Plant cafeteria or commissary service.....	67.7	.2	6.1

¹ Based on a survey conducted by the U. S. Public Health Service. The 594,455 employees in surveyed industries represented 37 percent of the gainfully employed persons in the Chicago-Cook County area.

Source: Flinn, Robert H., M.D.: In *The Chicago-Cook County Health Survey*. New York, Columbia University Press, 1949, pp. 659, 662-663.

Table 21.—Types of physical examinations provided in surveyed companies of specified size, 1950¹

Size group	Number of companies in survey	Companies reporting specified examination		Factory		Office		Executive	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Pre-employment									
All companies ²	3,589	1,893	52.7	1,867	52.0	1,179	32.9	911	25.4
1-250	1,901	564	29.7	554	29.1	242	12.7	186	9.8
251-500	617	437	70.8	431	69.9	256	41.5	177	28.7
501-1,000	466	359	77.2	356	76.6	242	52.0	185	39.8
1,001-2,500	356	316	89.0	309	87.0	249	70.1	203	57.2
Over 2,500	200	193	95.5	192	95.0	176	87.1	147	72.8
Periodic									
All companies ²	3,589	818	22.8	645	18.0	408	11.4	470	13.1
1-250	1,901	212	11.2	184	9.7	106	5.6	109	5.7
251-500	617	167	27.1	123	19.9	82	13.3	88	14.3
501-1,000	466	137	29.5	107	23.0	62	13.3	77	16.6
1,001-2,500	356	159	44.8	121	34.1	79	22.3	94	26.5
Over 2,500	200	129	63.9	97	48.0	72	35.6	95	47.0
Return-to-work									
All companies ²	3,589	1,079	30.1	1,014	28.3	578	16.1	343	9.6
1-250	1,901	199	10.5	180	9.5	81	4.3	43	2.3
251-500	617	226	36.6	213	34.5	101	16.4	54	8.8
501-1,000	466	232	49.9	220	47.3	111	23.9	65	14.0
1,001-2,500	356	236	66.5	220	62.0	148	41.7	89	25.1
Over 2,500	200	173	85.6	170	84.2	130	64.4	87	43.1
Return-after-accident									
All companies ²	3,589	1,379	38.4	1,314	36.6	748	20.8	497	13.8
1-250	1,901	344	18.1	326	17.1	144	7.6	102	5.4
251-500	617	303	49.1	287	46.5	141	22.9	90	14.6
501-1,000	466	272	58.5	264	56.8	146	31.4	92	19.8
1,001-2,500	356	266	74.9	250	70.4	168	47.3	115	32.4
Over 2,500	200	180	89.1	175	86.6	142	70.3	93	46.0

¹ Based on a 1951 survey of member companies made by the National Association of Manufacturers. The 3.3 million employees in the companies which responded to the questionnaire included factory, office and executive personnel and represented more than 22 percent of the average number of employees in manufacturing establishments during 1950.

² Total includes companies which did not report number of persons employed.

Source: Bachman, George W., D.Sc., and associates: *Health Resources in the United States, Availability of Personnel, Facilities, and Services*. Washington, Brookings Institution, 1952. In press.

Table 22.—Number and percent of surveyed establishments in each size class employing specified type of medical, nursing, and auxiliary personnel¹

		Size class (number of employees)																											
		1-249			250-499			500-999			1,000-1,999			2,000-4,999			5,000 and over												
Type of personnel employed	Number of establishments employing specified personnel	Number of establishments employing specified personnel			Number of establishments employing specified personnel			Number of establishments employing specified personnel			Number of establishments employing specified personnel			Number of establishments employing specified personnel			Number of establishments employing specified personnel												
		Full time	Part time	On call	Full time	Part time	On call	Full time	Part time	On call	Full time	Part time	On call	Full time	Part time	On call	Full time	Part time	On call										
Medical director	2	2	8.7	3	8	2	13	34.2	2	18	1	21	36.8	8	28	3	39	52.0	4	58	79.5	38	18	4	60	89.6			
Assistant medical director				1	1	1	3	7.9	1	1	2	3.5	1	7	8	10.7	5	5	11	15.1	15	6	21	31.3					
Physicians—other than medical director and assistant medical director	4	3	7	30.4	5	7	12	31.6	1	12	8	21	36.8	—	—	15	12	27	36.0	5	21	15	41	56.2	20	35	11	66	98.5
Consultants—surgeons, dermatologists, etc.					2	8	10	26.3	—	4	8	12	21.1	—	—	3	11	14	18.7	—	3	23	26	35.6	—	6	18	24	35.8
Full-time nurses combining in-plant and visiting duties					14	14	36.8	23	—	—	23	40.4	26	—	—	26	34.7	30	—	—	30	41.1	21	—	—	—	21	31.3	
Part-time nurses combining in-plant and visiting duties					1	1	1	2.6	—	2	2	3.5	—	—	3	—	3	4.0	—	—	47	62.7	53	—	2	2.7	—	2	3.0
Full-time in-plant nurses	2	2	8.7	13	—	—	—	34.2	23	—	23	40.4	47	—	—	10	13.3	—	—	10	13.3	—	—	53	72.6	51	—	51	76.1
Part-time in-plant nurses	1	1	4.3	—	—	—	—	—	—	3	3	5.3	—	—	1	—	1	1.3	—	—	8	11.0	—	—	5	—	5	—	7.5
Dental hygienists					1	1	1	2.6	—	—	1	—	—	—	—	3	3	4.0	4	—	1	2.7	3	—	2	4.0	—	4	6.0
Industrial hygienists					2	1	3	7.9	3	—	3	5.3	2	—	1	—	3	5.3	2	3	5	6.8	13	2	—	5	15	22.4	
Practical nurses	2	2	6	3	17	44.7	5	8	1	14	24.6	6	4	1	11	14.7	8	6	—	2	16	21.9	11	7	18	26.9	5		
First-aid attendants	3	3	1	7	30.4	8	6	3	—	1	2.6	2	—	2	3.5	2	1	—	3	4.0	5	1	1	7	9.6	7	1	8	11.9
Doctor's assistants (non-professional)					1	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

¹ Data are based on a survey of 333 industrial establishments in the United States and Canada—few Canadian companies participated. Industries covered a work force of more than 1.5 million persons, with 6.9 percent of the establishments employing less than 250 workers and 20.1 percent with 5,000 or more. More than 30 types of industrial groups participated. With only 2 exceptions, not more than 10 percent of the 333 cooperating establishments were in any 1 group (machinery, 10.8; metals, 13.2).

Source: Spears, Ethel M.: *Company Medical and Health Programs (Studies in Personnel Policy No. 96)*. New York, National Industrial Conference Board, Inc., 1948, pp. 15-16.

Table 23.—Distribution of companies according to percent of applicants rejected as a result of pre-employment physical examinations, selected studies, 1924-1951

Percent of applicants rejected	Percentage distribution of companies			
	¹ 1924	² 1930	³ 1940	⁴ 1951
Companies reporting.....	100.0	100.0	100.0	100.0
0-5.....	55.0	60.0	78.0	⁵ 81.5
6-10.....	28.0	23.0	15.0	13.1
11-50.....	17.0	17.0	7.0	5.4

¹ National Industrial Conference Board, Inc., *Medical Care of Industrial Workers* (1926), p. 34.

² National Industrial Conference Board, Inc., *Medical Supervision and Service in Industry* (1931), p. 32.

³ National Association of Manufacturers, *Industrial Health Practices* (1941), p. 14.

⁴ National Association of Manufacturers, 1951 survey.

⁵ Includes 160 companies, 13.9 percent reporting "few," "small," and so on.

Source: Bachman, George W., D.Sc., and associates: *Health Resources in the United States, Availability of Personnel, Facilities, and Services*. Washington, Brookings Institution, 1952. In press.

Exhibit 3.—Reasons often given by small industries for not having health departments

1. Business is too poor now and we cannot add another overhead investment.
2. A health service costs too much.
3. There is not room for a dispensary. We expect to move to a new location and will consider the matter at that time.
4. There are other projects before us now, such as installing new machinery and building new additions.
5. We have no illnesses nor absenteeism because we have a bonus which is paid employees for staying on the job. Furthermore, the employees would resent the substitution of a health service for the bonus.
6. We feel that our type of employee is above the average, being well paid, and should, therefore, go to his own physician. It is felt that the employees would not agree to having a plant physician give them a physical examination.
7. Our home office is in another city and will not permit a health service in our branch.
8. In food manufacturing plants such as ours, a physical examination certificate is required by the state for each employee, but as this is not well enforced, the company usually has the employee obtain his own certificate from a physician and feels that the responsibility is thus completed.
9. We are not interested because the employees are all piece workers and the management is not particularly concerned as to the responsibility for their illnesses.
10. All of our cases are sent to the insurance or a private physician, the arrangement being satisfactory so far.
11. The management believes that a new venture such as a health service coming into the organization might interfere with the close contact between management and employees.
12. Our business is too seasonal to obtain complete advantages from a health service.
13. We expect to build a new plant later on and will consider a health service at that time.
14. The theory of a health service is paternalistic and we do not believe in giving free medical advice.
15. We have previously had an unfortunate experience with a physician.
16. Our organization has recently suffered a fire loss and is, therefore, unable to consider a service at this time.

17. Through the death of a plant official, our company is undergoing reorganization.

18. Because of a recent merger, we are unable to give any decision at present.

Source: Sappington, C. O., *Industrial Health Asset or Liability*. Chicago, Industrial Commentaries, 1939, pp. 24-26.

Exhibit 4.—Procedure for establishing a small plant health service

A joint enterprise of the Chamber of Commerce and Board of Trade of Philadelphia, through its health committee and the Philadelphia County Medical Society.

STEP I

Send out Chamber of Commerce and Board of Trade letter No. 1.

STEP II

Send out Chamber of Commerce and Board of Trade letter No. 2.

STEP III

Send out Chamber of Commerce and Board of Trade letter No. 3, calling meeting. At the end of meeting request names of interested employers and announce that Mr. Wills, Secretary of the Health Committee of the Chamber and Board, is anxious to contact those employers who become interested at a later date.

STEP IV

Employer should decide whether he wishes:

(a) Service from the physician's office, i. e., the employees go to this point for pre-employment and periodic checkup examinations, minor accidents, and redressing service.

(b) Service in the plant through a dispensary layout.

(c) Service to a cooperating group of industries within the same building or the immediate vicinity.

(d) Amount of money to be spent for medical service.

STEP V

Determine if the usual compensation physician is acceptable to the interested employer, and request name of the insurance carrier.

STEP VI

Health Committee's industrial representative and medical representative to contact nominated physician:

1. Can he give the time?

2. Will he learn the technic?

3. If unwilling, does he understand that with the consent of the County Medical Society another physician will be asked?

4. If the physician declines:

(a) Ask the employer for his own next choice.

(b) Suggest names of physicians interested in industrial work.

(c) Health Committee shall keep in contact with the employer until a satisfactory choice of physician has been made.

5. When a physician is selected, arrange a meeting of the physician and the employer to establish rate of pay, hours of service and type of medical service desired.

6. Advise employer to request a plant survey by the State Bureau of Industrial Hygiene for the purpose of helping the physician.

STEP VII

Send to the physician:

(a) Reprints of articles on Medical Service in Industry released by the Council on Industrial Health of the American Medical Association.

(b) Résumé of Compensation and Occupational Disease Laws printed in the May, 1941, issue of the *Pennsylvania Medical Journal*.

(c) Copy of the Connecticut Chart of Hazards in Industry.

(d) Copy of Dr. Glenn Everts' material prepared for the employer.

(e) Short bibliography on industrial health.

(f) Inform the physician that the Health Committee, and the Committee on Industrial Health of the Philadelphia County Medical Society stand ready to assist him at all times.

DEAR MR.:

The War certainly has made you increasingly aware of the need for medical service in your plant. Our Health Committee desires to interest you in the establishment of a medical service for the benefit of your employees, both as a humane effort and to maintain production.

The Committee feels that it will be in a position to demonstrate how you can initiate such service, either from within your plant or from a nearby community location, supervised by a physician at a reasonable cost.

We would like to acquaint you with the advantages of such facilities and expect to send you further information on the subject in the near future. Assuring you that the proposal has the approval of Organized Labor and that it is our desire to cooperate in the advancement of your interests, I am

Very truly yours,

GEO. E. WHITWELL, *President,
Chamber of Commerce and Board
of Trade of Philadelphia.*

DEAR MR.:

You are cordially invited to attend a meeting in our Assembly Room, 1129 Walnut Street, September 21st, at P.M., for the purpose of discussing with our Health Committee plans whereby you may obtain the medical service for your employees mentioned in my previous letters.

I trust that you will be present. A return card is enclosed for your convenience. Meanwhile, I am

Very truly yours,

GEO. E. WHITWELL, *President,
Chamber of Commerce and Board
of Trade of Philadelphia.*

Source: Chamber of Commerce of the United States, Health Advisory Committee: *Industrial Health: A Tale of 3 Cities*. Washington, The Chamber, circa 1945. pp. 14 and 15.

Exhibit 5.—How a plant medical service operates: Questions and answers prepared by the Health Committee of the Chamber of Commerce and Board of Trade of Philadelphia

I. QUESTION.—What medical service is available to a small plant at reasonable cost?

ANSWER.—(a) The best plan is an arrangement whereby a physician and possibly a nurse give part-time service in a dispensary located within the plant itself. The number of hours per week needed depends upon the number of employees, and the accident and health hazards peculiar to the industry.

(b) Or a nearby physician in his own office may be utilized for the physical examination program, and the accident and illness work at certain hours.

(c) When located in a building housing two or more industries, it may be feasible for several or all to arrange a centralized medical unit with a dispensary serving all groups on a per capita basis.

(d) Likewise when several plants are grouped in a neighborhood, arrangements may be effected whereby a central dispensary may be established, the service to be financed on an employee per capita basis. In either arrangement, as in (c) or (d), the building, equipment and rental of the dispensary space would be worked out on a pro rata basis according to the number of employees of each participating unit or plant.

II. QUESTION.—Will a medical service decrease the lost time due to accidents?

ANSWER.—Yes, in the following ways:

(a) By prompt first aid.

(b) By redressing injuries at work which otherwise would need such care outside.

(c) By adequate daily care of minor illnesses and injuries which might otherwise become lost man-hours.

(d) Trained medical personnel can determine from the character of sprains, bruises, and other minor injuries whether the employer-employee interests are best served by retaining the patient on his job, or according him an immediate few days' rest.

(e) By assuming responsibility for the proper disposition of serious accidental injuries and the after-care of those patients in order to insure the earliest safe return to the job.

III. QUESTION.—Will a medical service decrease the number of accidents?

ANSWER.—Yes, although the work of a physician or nurse will not take the place of a good safety program, it will HELP in the following ways:

(a) The physician and nurse, while treating an injury, appropriately instruct the patient in personal safety precautions.

(b) By raising the general health level of employees and keeping them as free as possible from aches and pains while on the job—to the end that the accident risk will be reduced in proportion to the relationship which personal unfitness bears to that risk.

(c) By coordinating the plant safety program with essential accident records and advice.

IV. QUESTION.—Will medical service decrease man-hours lost through illness?

ANSWER.—Yes, in these ways:

(a) By treating the employee's minor illnesses on the job in order to keep him on the job.

(b) By advising an employee who is really sick to consult his family physician immediately and thus shorten the duration of his illness.

(c) By urging him to seek medical diagnosis and treatment of his more serious ailments before they become chronic.

(d) And by inspecting the plant with reference to health hazards and making such recommendations as will help prevent illness from occupational cause.

V. QUESTION.—Will a medical service reduce labor turnover?

ANSWER.—Definitely, yes, insofar as proper job-placement and good will toward management make for employee contentment:

(a) Routine pre-employment or pre-placement examination—an integral factor of any medical service in industry—is designed to assure the employee's physical and mental suitability for a job.

(b) Various personal contacts the employee makes with the physician or nurse, and the help he thus finds available, smooth the tough spots for him or: (1) Medical care of his minor and discomforting illnesses while on the job may enable the employee to continue work; (2) medical advice concerning pains or other com-

plaints results in mutual understanding; (3) advice to the employee on general health matters confronting him; (4) friendly counsel on treatment to be rendered the employee by other medical agencies—viz.: the family physician, clinic or hospital.

VI. QUESTION.—Will a medical service reduce the compensation insurance premium?

ANSWER.—Yes.

VII. QUESTION.—What is the experience of plants, which now have a medical service, with respect to absenteeism, labor turnover, compensation premiums, etc.?

ANSWER.—The most practical answer to this question will be found in a pamphlet entitled: "Industrial Health Practices" which cites the results of a 1940 survey by the National Association of Manufacturers. It represents the replies from 2,064 industrial establishments regarding their health practices, and it has this to say about the value of the health plant program: "Health programs have proved their worth to the companies instituting them."

(a) An estimate on the basis of reductions in various health hazards reported in this survey revealed that a health program saves the average 500-employee plant over \$5,600 net per year.

(b) All but five of a total of 1,625 respondents considered their program as paying propositions.

(c) Over 90 percent of those replying indicated reductions in accident frequency, occupational diseases, absenteeism and compensation insurance premiums.

(d) Between 85 and 90 percent indicated reductions in labor turnover, in addition to 83 percent who reported a good effect on their labor relations.

(e) Specific percentage reductions as follows were reported:

	<i>Percent</i>
Accident frequency	44.9
Occupational diseases	62.8
Labor turnover	27.3
Absenteeism	29.7
Compensation insurance premium	28.8

VIII. QUESTION.—What is the scope of a good medical service for a small plant? What are the duties of a physician?

ANSWER.—At first it may not be possible to achieve the ideal, but it should be aimed at. On the other hand, it may be feasible to go beyond this minimal standard and include arrangements for a more complete service, such as X-ray work and laboratory procedure. The items of a standard service are these:

(1) The physician or nurse will dispose of all plant accident cases as follows:

(a) Assume personal care of the injury during medical service hours.

(b) Delegate competent first-aid attendant in charge to communicate with the physician regarding disposition of emergency cases at odd hours.

(c) Arrange with the surgical service at local hospital to care for such cases as prove too serious for treatment at the plant. (Similar arrangements may be made with the office of the plant physician or that of the appropriate insurance company surgeon, as deemed advisable.)

(d) Redress injuries suffered by those actively employed and the occupationally disabled at the plant dispensary.

(e) Arrange with an eye specialist to whom all plant eye accidents may be sent in the absence of the physician or the nurse.

(f) The physician assumes responsibility for a decision as to whether an injured employee shall be sent home and when he should resume work.

(2) The physician or the nurse will treat such illnesses as an individual may develop while on the job—if the medical personnel is in the plant. They will judge whether he is too sick to continue work, and consequently send him to his own

physician, or decide that he can be helped through the day with simple medications. They also will make an effort to see every employee promptly upon his return to work from a disability beyond a few days; also determine the nature of his illness and whether the individual is well enough to be at work.

(3) Because the physical examination is basic in all sound industrial health work, the physician will make every effort, within the time available, on whatever part-time schedule can be worked out, to make these three types of examinations:

(a) A pre-employment examination, now better termed a pre-placement examination, of every employee before he starts to work or as soon thereafter as practicable.

(b) Periodic health examination of all employees, for the purpose of urging the correction of defects.

(c) Where recognized occupational hazards are present, a special examination of all employees exposed to them will be made as frequently as necessary in cooperation with the safety engineer.

(4) Both the physician and the nurse cooperate in the plant safety program by contributing such records as safety education and plant inspection may require.

(5) The physician should make periodic plant surveys for health hazards, good housekeeping and sanitation.

(6) And finally, with regard to records:—The physician or the nurse will provide a detailed record of dispensary work each month. In the dispensary a record will be kept of each examination and visit. The dispensary may assume the responsibility for preparing the original accident report.

IX. QUESTION.—What will be the cost of such medical service for my plant?

ANSWER.—Your attention is called specifically to these general considerations:

(1) That medical costs vary quite widely according to the type of industry.

(2) This variation depends upon: (a) The number of persons employed; (b) whether the plant has a relatively large number of accidents; (c) whether the plant has an appreciable number of employees exposed to serious occupational disease hazards; (d) the extent of health service contemplated.

(3) Medical costs are made up of these three items:—the physician's fee; the nurse's fee and the dispensary costs.

(4) The three items indicated will vary according to the number of hours per week a physician and a nurse are needed, and the amount of supplies used, plus rent paid.

The physician's and nurse's fees should be decided by the plant executive and the physician contemplating the service.

It has been a matter of experience that in a dispensary not equipped for X-ray and laboratory work, the supplies will cost about \$20.00 per month for a plant of 100 employees; \$60.00 for one of 500 employees.

Experience shows that the physician usually gives 3 hours of his time per week per 100 employees, divided into no fewer than two visits per week; while the nurse usually gives 6 hours per week and is in the plant daily.

X. QUESTION.—What about the dispensary? How large should it be? What will it cost? Where can it be put?

XI. QUESTION.—Where can I get a physician for this proposed service?

XII. QUESTION.—What will organized labor think of introducing such a service?

ANSWER.—Questions X and XI—probably many others—may justify an interview with the health committee. Arrange this with the secretary, H. W. Wills. Question XII: Your committee's consultation with official representatives of the A. F. of L., the C. I. O. and the Railway Brotherhood assured organized labor's approval of the foregoing procedure.

Source: The Health Committee of the Chamber of Commerce and Board of Trade of Philadelphia: *Why Plant Industrial Medical Service Should be Adopted*. Philadelphia, The Committee. Circa 1943. 11 pp.

Exhibit 6.—Agreement between physician and companies participating in Hartford Small Plants Medical Service

This Agreement made as of the day of, 19.., by and between (six companies), hereinafter sometimes referred to as the "Companies," and Dr. of County, Connecticut, hereinafter referred to as "Doctor."

WITNESSETH

Whereas, the Companies desire the services of a physician trained in the field of industrial medicine,

Whereas, Doctor is a duly licensed physician trained in and restricting his practice to the field of industrial medicine,

Now therefore, the parties hereto agree as follows:

1. In consideration of the payment of a fee to Doctor by the Companies in the sum of (.....) Doctor agrees to render medical services as hereinafter described to the employees of the Companies for one year from, 19.., such fee to be paid by the Companies and such services to be rendered by Doctor, on a percentage basis, in accordance with the following table:

Company	Percentage	Fee	Hours of weekly services
	20		8
	10		4
	15		6
	15		6
	15		6
	25		10
	100		40

The schedule of weekly service during the usual business hours at each Company's plant shall be arranged by Doctor and shall be subject to variation by him upon his giving reasonable notice to the Companies except in the case of emergencies.

2. Each of the Companies agrees to pay to Doctor its share of his fee for professional services agreed to be rendered under this Agreement as set forth in paragraph 1 hereof in the following manner: Doctor shall bill each of the Companies for its share of his said fee and thereupon each of the Companies shall deposit the amount of its share of his said fee in a lump sum or in installments at least monthly in advance with Bank and Trust Company,, Connecticut, which is hereby appointed the agent of the Companies for the purposes hereof. Said Bank shall pay to Doctor from the funds so deposited by the Companies the amount of his said fee in monthly installments at the end of each month, beginning with, 19..

3. Nothing herein contained shall be construed as forbidding Doctor from engaging in private practice. Doctor agrees that such private practice, except in the case of emergencies, shall not interfere with his obligations under this Agreement.

4. Doctor shall perform such professional services as physician for the benefit of the employees of the Companies as the Companies may require, but the Companies shall respect Doctor's professional status and shall make no direction or any requirement of him as to the method or manner of performing such services.

5. Each of the Companies agrees to provide on its own premises and at its own expense minimum facilities for the convenience and use of Doctor in discharging his duties under this Agreement, which facilities shall consist of a basic unit comprising a dispensary and instruments and supplies. Doctor shall furnish to each of the Companies within thirty days from the date of this Agreement a budget for said basic unit facilities, including the initial installation and the cost of instru-

ments, supplies and/or materials reasonably required in the operation of said basic unit facilities for the term of this Agreement and, upon the approval by each Company of its said budget (as it may in each case be modified or altered), Doctor may be authorized to purchase the instruments, supplies, and/or materials provided for in each said budget, prorating the cost thereof where applicable to the Companies in accordance with the cost of instruments, supplies and/or materials delivered to each Company.

6. Each of the Companies shall employ at least one full-time registered nurse during the term of this Agreement. None of the Companies, however, shall employ or discharge a registered nurse without prior consultation with Doctor. All registered nurses, trained attendants and first aiders of the Company shall be responsible to Doctor in all matters concerning professional conduct.

7. Each of the Companies shall designate one of its officers or other executive employee who shall be responsible for all decisions as to all matters affecting his company arising under this Agreement and reported to him by Doctor.

8. Doctor shall furnish services and treatment under this Agreement to the employees of the Companies for occupationally incurred conditions only, except as provided in paragraph 11, and Doctor shall not be required under this Agreement to render treatment to the families or dependents of such employees.

9. Doctor agrees to refer any question of ethics which cannot be resolved between the parties hereto to the appropriate section of the Hartford County Medical Association.

10. Doctor's duties shall be as follows: In accordance with the ethics of medical practice of the American Medical Association and the County Medical Association, he shall

(a) Give pre-placement examinations of all applicants for employment by the Companies, take waivers of disabilities in connection therewith, and give reexaminations of employees both periodically and at the termination of their employment.

(b) Be available for private consultations with employees on the premises of the Companies.

(c) Treat occupational illnesses and minor occupational injuries of employees, and render first aid and advice on or about the premises of the Companies in the case of non-occupational injuries and illnesses of employees.

(d) Furnish laboratory examinations for employees of such of the Companies as furnish requisite facilities therefor.

(e) Furnish advisory assistance to the Companies (1) in connection with established safety programs designed to reduce health and accident hazards associated with industrial materials, equipment or plant conditions, (2) in matters of sanitation and nutrition and in the formulation of medical standards and (3) in connection with rehabilitation of injured employees and returning veterans, and make monthly recommendations thereon in writing to each of the Companies.

(f) Establish and maintain adequate medical records and statistics. Except as to the interpretation and presentation of such medical information regarding individual employees to officers and executives of the Companies employing them as is necessary for determining personnel policies and procedures, all physical and clinical records shall be confidential and accessible only to Doctor and to nursing personnel of the Companies responsible to Doctor.

(g) Promulgate and maintain appropriate standing orders for the registered nurses employed by the Companies.

(h) Supervise job placement on a medical basis.

11. Doctor shall give reasonable notice to each company of his absence or intended absence, as the case may be, to attend medical meetings, or on account of illness, vacation or for any other reasons, and, if requested to do so by the

Companies or one or more of them, he shall designate and have available a competent licensed physician or physicians to perform such medical services as the Companies may require in his absence; each Company shall pay to such physician or physicians reasonable compensation for such emergency services rendered its employees. Doctor agrees to limit his vacation to a period not in excess of two calendar weeks. In the event of Doctor's inability to perform his duties under this Agreement for a period in excess of thirty consecutive days, Doctor shall notify the Companies and the Companies shall be free notwithstanding the provisions of this Agreement to obtain medical services on an individual Company basis or in concert as they may desire; in such event the Companies shall be relieved of their obligation to pay Doctor the amount of his fee for the period of his absence in excess of said thirty consecutive days and shall instruct Bank & Trust Company not to pay Doctor such amount. In the event of Doctor's inability to perform his duties under this Agreement for a period in excess of ninety consecutive days, this Agreement shall thereupon terminate and each party shall be relieved of his or its obligations hereunder except as to matters accruing prior to such termination.

12. Each of the parties hereto agrees to notify the other in writing on or before 19.., of his or its intention to extend or renew this Agreement for the succeeding calendar year, said notice to include any and all changes or modifications which may be desired in such extension or renewal.

In Witness Whereof this Agreement has been duly executed by the parties hereto in septuplicate as of the day and year first above written.

Source: Buchan, Ronald Forbes, M.D., C.M.: Medical Services for Small Plants. *Occupational Medicine*, 5 : 403-416 (April) 1948.

Exhibit 7.—Williamsport promotional letters

To Industrial, Labor and Retail Heads:

WEALTH IS NOT HEALTH, but Health is Wealth. In these war days with everyone at work, with national income and purchasing power at an all-time high, with the public thinking more of making money than of keeping well, and with a definite and growing scarcity of available medical care, it is doubly important that Health Conservation be emphasized over and over again.

All the above make up the reasons why COMMUNITY HEALTH CONSERVATION WEEK has been scheduled for Williamsport next week and is being jointly sponsored by the Lycoming County Medical Society and the Community Trade Association. In the press, over WRAK and thru addresses will the public be told of the objects of this week.

It is our purpose in this letter to advise our industrialists, labor leaders and mercantile establishments of the highlight event next week, which will be an evening meeting, on Thursday, September 10 (1942) at 8 o'clock in the gymnasium of the YWCA on the subject of "Industrial Health." Practical and workable industrial health programs now in operation in other American cities will be discussed with a view toward setting up a plan for Williamsport. Also, reference will be made to the recent industrial health survey of local plants.

Outstanding guest speakers on this occasion will be: Dr. Orlen J. Johnson, Council on Industrial Health, American Medical Association; Dr. Charles-Francis Long, chairman, Committee on Industrial Health, Pennsylvania State Medical Society; Dr. Joseph Shilen, director, Bureau of Industrial Health, State of Pennsylvania.

We urge you to have substantial representation from your organization or firm at this important meeting. Industry, labor and retailing are the trio that must coordinate all efforts towards a healthier and safer Williamsport in the days ahead.

The holding of Health Conservation Week and the meeting on September 10 is planned for your direct benefit. It is a war conservation effort. Please regard it

as such and make yourself a committee of one responsible for adequate representation from your group at this meeting.

Anticipating your complete support, we are

Very sincerely yours,

DR. P. H. DECKER,

President, Lycoming County Medical Society.

EDWARD M. FLYNN,

President, Community Trade Association.

DR. J. P. HARLEY,

Chairman, Lycoming County Medical Defense Committee.

DEAR SIR:

By this time we hope you have had an opportunity to read over the material mailed you regarding the plan for industrial health conservation in Lycoming County industries. We hope you have also given real thought to the setting up of such a program in your plant in some form and at an early date.

There are two Industrial Health Committees set up in Williamsport which can be of real assistance to you. They represent the Lycoming County Medical Society and the Community Trade Association. . . .

Please feel free to consult any individual member of either Committee at any time or if you wish to confer with either Committee or both we will gladly arrange such a meeting at your convenience.

We are assembling at the CTA office a vast fund of information on this rather new subject, all of which is available to you at any time. Data now on hand include the following:

A physical setup can be established in your plant for from \$200 to \$1,000 or more, depending largely on the number of employees you have and the extent you might wish to go in rendering maximum service to your people. A suggested list of equipment is enclosed for your consideration. You may wish to personally examine these two layouts before you decide what to do in your plant. Another half dozen local plants have similar layouts.

Other information you should know now is contained on other sheets enclosed.

Another enclosure has been drawn up by Dr. Harley for your use if you see fit. It briefly describes the program to your employees if, as, and when you are ready to install health facilities in your plant.

Industrial health is coming throughout the country with considerable rapidity and Williamsport should keep pace in this commendable program as it has in all other good things. It has been said from experience that a plant saves twice what it spends on industrial health.

Won't you consider seriously creating such a program in your plant soon and let us help you do so? We are at your service.

Sincerely yours,

DR. P. H. DECKER,

President, Lycoming County Medical Society.

EDWARD M. FLYNN,

President, Williamsport Community Trade Association.

DEAR SIR:

The accompanying booklet on the general subject of Industrial Health in Williamsport industries is being forwarded with the main thought of publicizing what is being done locally, hoping to advance and accelerate our program in more industries, feeling confident of its importance to every employer.

Favorable expressions from those of our local employers who have had personal

experience with a plan in their own industry, should be a decided factor in helping you to establish a similar plan in your own plant. It can be adapted to industries of large or small numbers of employees and you can secure information as to details and costs from them or us as a committee. . . .

The health and physical fitness of your worker is as important to you as the condition of your machinery.

Don't be indifferent to the importance of the fitness of your manpower.

In war or peace, no plant is too small or too large to profit from a health program which pays in dollars and cents, and in improved human relationships between employer and employees.

Yours very truly,

(Dr.) JOHN P. HARLEY,

Chairman, Industrial Health Conservation Committee.

Source: Chamber of Commerce of the United States, Health Advisory Committee: *Industrial Health: A Tale of 3 Cities.* Washington, The Chamber, circa 1945. pp. 7-8.

Exhibit 8.—The minimum standards for medical service in industry, American Foundation of Occupational Health

1. The industrial establishment shall have an organized medical department or service with competent medical staff including consultants and also shall have adequate emergency, dispensary, and hospital facilities and personnel to assure efficient care of the ill and injured.

2. Membership on the medical staff shall be restricted to physicians and surgeons who are (a) graduates from an acceptable medical school, with the degree of doctor of medicine, in good standing and licensed to practice in their respective States or Provinces, (b) competent in the field of industrial medicine and traumatic surgery, (c) worthy in character and in matters of professional ethics; in the latter connection the practice of the division of fees, under any guise whatsoever, shall be prohibited.

3. There shall be a system of accurate and complete records filed in an accessible manner in the medical department, such records to include particularly a report of injury or illness, description of physical findings, treatment, estimated period of disability, and results, as well as other information pertinent to the case or required by statute for workmen's compensation claims or other purposes.

4. Patients requiring hospitalization shall be sent to institutions approved by the American College of Surgeons.

5. The medical department or service shall have general supervision over the sanitation of the plant and the health of all employees.

NOTE: The American Foundation of Occupational Health, a trust established by the Industrial Medical Association, became the sponsors of the program of surveys and appraisals of medical services in industry, formerly conducted by the American College of Surgeons. The transfer of this program by the College to the Foundation became effective as of May 1, 1951. In this transfer, the basic principles and standards as originally formulated for approval of medical services remain essentially unaltered.

Source: Hess, Gaylord R.: *Surveys and Appraisals of Medical Services in Industry.* Chicago, American Foundation of Occupational Health, 1951.

Exhibit 9.—Working principles of an adequate medical service

1. A definitely organized plan for the medical service.
2. A definitely designated staff of qualified physicians, surgeons, and attendants.
3. Adequate emergency, dispensary, and hospital facilities.
4. Pre-placement and periodic physical examinations—to be made only by qualified medical examiners.

5. Efficient care of all industrial injuries and occupational diseases.
6. Reasonable first aid and advice for employees suffering from nonindustrial injuries and illnesses while on duty. For further professional care such employees should be referred to their own private or family physicians.
7. Education of the employee in accident prevention and personal hygiene.
8. Elimination or control of all health hazards.
9. Adequate medical records, accessibly filed in the medical department under responsible medical supervision.
10. Supervision of plant sanitation and all health measures for employees by the physician or surgeon in charge.
11. An ethical and cooperative relationship with the family physician.
12. The use of approved hospitals.

Source: Hess, Gaylord R.: *Medical Service in Industry and Workmen's Compensation Laws*. Chicago, American College of Surgeons, 1946, p. 3.

Exhibit 10.—Essentials of an industrial dental service

1. The industrial establishment shall have an organized dental service, as further specified, with a competent staff including consultants and with adequate facilities to insure efficient care of all employees who need palliative emergency dental treatment because of occupational injuries or who have developed oral manifestations of occupational disease.
2. The dental department shall urge all employees to obtain necessary dental treatment and shall devote a portion of its time to educating them in the value of maintaining oral health.
3. The industrial establishment shall require thorough mouth examination of all persons entering employment. There shall be a system of complete and accurate records, filed in an accessible manner and available to the employee, to medical and dental services, and to Government agencies for identification purposes. In setting up the records to be maintained, the division of dental hygiene of the State department of health should be consulted in order that a uniform system of dental records may be developed that will make possible valuable statistical analyses and comparisons.
4. Membership on the dental staff shall be restricted to dentists who are (a) in good standing with the local dental society, and (b) qualified in such fields as may be included within the service.
5. The dental department or service shall have complete responsibility for the dental personnel as to the quality of service rendered.
6. Industrial dentists should be familiar with the industrial processes and watch closely for evidence of oral disease caused by such poisons as mercury, lead, phosphorus, fluorine, acids, and radioactive materials, and of other chemical or physical hazards. Immediately upon noting any oral evidence of occupational disease, other units in the industrial establishment, such as the medical department or safety engineering department, should be notified, to the end that cooperative study and action may be undertaken.
7. The industrial dental service shall limit itself to the services specifically mentioned above. X-ray and prophylactic services in newly established industrial dental programs, however, and all details (not included in pars. 1 through 6) of services in operation at the time of the adoption of these rules shall require merely the approval of the State dental society.

Source: American Dental Association, Committee on Dental Economics: *Dental Service in Industry*. *Journal of the American Dental Association*, 29: 300-301 (February) 1942.

Exhibit 11.—Principal defects of medical services in industry

1. The indiscriminate use of first-aid kits for the treatment of minor injuries still exists, though to a considerably lesser degree than in the earlier years of study made by the college. Often these first-aid treatments are self administered and the medical department has no knowledge of the injury unless it is subsequently seen as a secondarily infected case. This practice is vicious and economically most unsound and never should be permitted. However, for small plants not having the facilities of a plant dispensary, properly supervised use of first-aid kits is a necessity.

2. Many physicians in charge of industrial medical dispensaries have neglected to provide written "standing orders" or regulations to which dispensary attendants may refer in regard to handling medical and surgical cases which may arise during the physician's absence from the dispensary. The majority of physicians doing industrial work are employed on a part-time basis; hence it is advisable that dispensary attendants be informed as to proper procedures during the periods of the physician's absence. Verbal instructions do not provide adequate and infallible instruction.

3. A number of industrial establishments, both large and small, still maintain the practice of employing physicians on a call basis, for emergency service only. There may be periods of weeks and even months when the physician is not present in the plant dispensary. Consequently, the nurse in attendance is the supervisor of the whole medical service. It is generally conceded that a well organized medical service with a qualified physician in charge, who devotes some specified time to the medical department, will not only provide a more closely supervised service to both employer and employee, but will also more satisfactorily fix the responsibility of the medical service at one point.

4. One of the most consistent defects is found in the system of records maintained, and frequently this is the sole reason for the nonapproval of a medical service. Such recordings of injuries as "burn on leg," "cut finger," "foreign body in the eye," "contusion of hand or foot," etc., are examples of inaccurate descriptions of the specific anatomical sites of injuries. The cause of injuries and even the treatment rendered may not be recorded. There may be no records in reference to progress of follow-up cases requiring daily attention. The pre-placement physical examination form may be too brief, inadequate, and noninformative, poorly filled in, and not signed by the examining physician. Nonindustrial cases may not even be recorded, regardless of their nature. Medical records for every dispensary visit, both industrial and nonindustrial, should contain adequate information according to the outline under item 8 of part B of this section, according to the indications.

Occasionally medical records are kept on file in some other department, which is contrary to the best opinions and practices prevailing in industrial medical services. All medical records should be regarded as strictly confidential information and should be filed in the medical department under medical supervision.

5. Periodic health examinations were, through necessity, somewhat curtailed during the war emergency period. However, this important phase of an industrial medical service should not be lost. If such examinations are not possible for all, consideration should be given to certain groups, such as those with known physical defects, those holding key positions, those employed in departments where there is danger of occupational disease or at hazardous occupations, those over a certain age, such as 45 or 50, and those who handle food.

6. Perhaps the most consistent defect in medical service in industry is the apparent failure of the physician to acquaint himself with general plant sanitation, with special reference to plant inspections for the purpose of making personal observations and subsequent recommendations. This duty is often delegated to

some other department; however, only a physician is qualified to recommend measures for general health and plant sanitation. Periodic inspections by the plant physician are worthy of consideration. Refer to clause 5 of the Minimum Standard for Medical Service in Industry.

Source: Hess, Gaylord R.: *Medical Service in Industry and Workmen's Compensation Laws*. Chicago, American College of Surgeons, 1946, pages xii, 3, 47.

Exhibit 12.—Duties and responsibilities of the nurse in industry

1. Give emergency care for all occupational injuries as authorized by written standing orders signed by the physician in charge.
2. Give treatment for occupational injuries and illnesses under the supervision of the physician in charge.
3. Give emergency care for non-occupational disabilities and see that the patient is referred to his own physician for further treatment if necessary.
4. Organize and maintain a clean, smooth-running, and efficient health service unit.
5. Keep currently informed about plant processes and materials. This can be accomplished by frequent tours through the plant and conferences with department and division heads, foremen, purchasing agents, and others as may be indicated.
6. Participate in pre-placement, periodic, and annual medical examinations of workers.
 - a. Interview workers to explain the purpose of the examination, the procedures, and their significance.
 - b. Obtain and record personal and occupational history of the worker.
 - c. Complete as much of the examination as is approved by the physician. This may include making routine tests and measurements, such as height, weight, hearing, visual acuity, urinalyses, dental inspections, taking blood pressure, pulse, temperature and respiration, and obtaining specimens of serological examination and other laboratory tests.
 - d. Assist physician with physical examination as necessary and chaperone women workers.
 - e. Confer with worker to interpret medical findings, plant policies for health and welfare, and to assist him in making plans for his necessary care.
 - f. Make periodic inspections for symptoms and indications of occupational disease, as of employees working with benzene, lead, or other toxic substances.
 - g. Interview workers in connection with return-to-work permits to assure their fitness for work.
7. Participate in the plant health and safety educational program.
 - a. Integrate health instruction in the training program for new employees.
 - b. Do some health and/or safety teaching during each service to the employee.
 - c. Do follow-up for correction of remediable defects.
 - d. Give health supervision to workers with chronic conditions and see that they periodically consult their private physicians.
 - e. Assist in the rehabilitation of employees with physical handicaps.
 - f. Keep workers informed regarding current local health problems and health programs through the use of posters, pamphlets, movies, or slides, and/or group talks as indicated.
 - g. Contribute timely health articles to plant publications.
 - h. Promote and assist in the organization of classes to meet specific needs such as personal hygiene, nutrition, etc.
 - i. Assist in placement of workers according to physical and mental fitness.
 - j. Analyze reports for evidence of conditions needing improvement.

- k.* Attend meetings of safety committee.
- l.* Assist in the promotion and (if necessary) teaching of first-aid courses for employees from each department.
- m.* Promote the proper use of protective equipment and when indicated demonstrate care of such equipment.

8. Assist with plant sanitation.

- a.* Know the requirements of State factory laws that pertain to illumination, ventilation, cleanliness, eating facilities, and provisions for adequate toilets as well as for rest, wash, and change rooms.
- b.* Present suggestions to management for the improvement of all phases of plant environment that affect the health and morale of the workers.

9. Participate in plant welfare activities.

- a.* Interpret (or encourage) group sick-benefit, hospitalization, and life-insurance plans.
- b.* Counsel workers on all health and welfare problems of concern to them.
- c.* Assist in the development of recreation programs as indicated.
- d.* Promote and assist in securing and maintaining adequate eating facilities for all employees.
- e.* Cooperate with all community health and welfare agencies to the end that employees have adequate help in meeting their problems of nonoccupational as well as occupational origin.

10. Maintain in confidential files and regularly analyze employee records and health service reports.

- a.* Maintain an individual record for each employee seen in the health service unit.
- b.* Record every service rendered to each individual employee on his individual record and use this record as the basis for health counselling.
- c.* Make compensation reports according to plant policy.
- d.* Submit daily, weekly, or monthly, and annual reports to plant physician and/or management; and interpret such reports as evidence of accomplishments or as needs for further activities.

11. Keep abreast with developments in science, in industry and in her profession through:

- a.* Active membership in professional and civic organizations.
- b.* Reading of professional and industrial magazines.
- c.* Participation in study groups.
- d.* University study when possible.

Source: The American Association of Industrial Nurses, Inc.: *Duties and Responsibilities of the Nurse in Industry*. New York, The Association, 1949. (Approved by the members of the A. A. I. N. during their annual meeting, April 9, 1949.)

Exhibit 13.—Recommended qualifications for industrial nurses working without nursing supervision

Professional Qualifications:

1. Graduate from a school of nursing accredited by the State board of nurse examiners.
2. Current registration in the State of employment.
3. Minimum of 5 years' experience in nursing as a graduate registered nurse of which at least 1 year has been under direct nursing supervision and preferably in one or more of the following:
 - (a) An industrial medical department.
 - (b) An emergency clinic connected with an accredited hospital.
 - (c) A community health agency such as health department or visiting nurse association.
4. Some university study and a plan for continued professional development

through further study of such courses as: sociology, psychology, English composition, industrial safety, industrial nursing, public speaking, or introductory public health courses.

5. Active membership in professional organizations, particularly the American Nurses' Association and the American Association of Industrial Nurses.

Knowledge and Skills Needed:

1. Through knowledge of nursing principles, methods, and procedures.
2. Skill in performing nursing techniques.
3. General knowledge of occupational diseases and occupational hazards.
4. Working knowledge of compensation laws and insurance practices.
5. Knowledge of community health and welfare resources and how these organizations function, their policies and procedures.
6. General knowledge of labor and management relations.
7. Sufficient knowledge of business practice to set up and maintain simple office procedures.
8. Understanding of the value of records, and knowledge of record keeping.
9. Ability to inspire confidence and establish rapport.
10. Interest in and ability to establish and maintain good human relations.
11. Knowledge of methods of health and safety education and ability to teach.
12. General knowledge of preventive health measures and community rules and regulations.

Lacks in these areas of knowledge and skill should be recognized and a plan made for their remedy through

- (a) a planned introductory experience, and
- (b) use of nursing consultation service from the company if available, the industrial insurance carrier or the industrial hygiene service of the State or local department of health or labor.

A trial period on the job of 3 to 6 months is especially helpful in determining the adaptability of the nurse to the particular position. During this time, management should provide opportunity for her to learn the plan of organization of the industry, its policies, the various plant processes from raw materials to finished product, and to establish clearly her place within the organization.

Source: The American Association of Industrial Nurses, Inc.: *Recommended Qualifications for Industrial Nurses Working without Nursing Supervision*. New York, The Association, 1950. (Approved by the members of the A. A. I. N. during their annual meeting, April 27, 1950.)

Exhibit 14.—A yardstick for measuring industrial nursing services in your plant

A self evaluation form for industrial nursing services in an industry where the health program is conducted under the direction of a qualified industrial physician as recommended by the Council on Industrial Health of the American Medical Association.

I. Nurses' Evaluation

	Yes	No
A. Qualifications		
1. Personal		
a. Good physical and mental health	_____	_____
b. Adaptability to environment and to other working personnel	_____	_____
c. Ability to organize	_____	_____
d. Well groomed—full dress uniform, including nurse's cap, white shoes and nurse's pin	_____	_____
2. Academic		
a. High school graduation	_____	_____
b. Advanced education on a college level	_____	_____

		Yes	No
3. Professional			
The nurse should have a knowledge of the Nurse Practice Act in the State of employment.			
a. Graduation from an accredited school of nursing			
b. Registration in State of employment			
c. Advanced education on a college level			
(1) Industrial nursing and allied courses			
(2) Public health nursing courses			
d. Professional Membership			
(1) Alumnae			
(2) District, State and American Nurses' Assoc.			
(3) Industrial Nurses' Section, Illinois State Nurses' Association			
(4) National professional organizations			
B. Written Standing Orders or Procedures			
1. Provided and written by an on-call, part-time or full-time industrial physician			
2. Revised and dated annually by the industrial physician in charge			
C. Routine Organization and Maintenance of Plant Medical Department			
1. Medical department management			
2. Purchase and preparation of supplies			
3. Records and reports			
D. Nursing Treatment and Care of			
1. Occupational injuries and illnesses			
2. Emergency care of non-occupational conditions			
E. Assistance in the Medical Examination Program			
1. Assisting the industrial physicians with the mechanics of the physical examination			
2. Taking personal history and occupational history			
3. Interpretation to worker of plant policy regarding health and need for cooperation			
4. Testing vision and hearing acuity			
5. Blood pressure, height, weight, temperature, pulse, and respiration			
6. Laboratory tests and explanation of significance. X-rays, diathermy and infra-red treatment must always be given under direct medical supervision			
7. Periodic inspection of workers working with toxic material for indications of occupational exposure or disease			
8. Screening of workers requesting release from work and screening of workers returning to work following illness			
9. Worker instruction regarding remediable conditions found during physical examination and follow-up of corrections			
10. Supervision and rehabilitation of workers with adverse health conditions			
F. Participation in Health Education Program			
1. Individual health counselling			
2. Group or mass health education programs			
3. Publicity methods (bulletin boards, pamphlets, articles in house organ, etc.)			
4. Utilization of community resources including private			

	Yes	No
physicians, dentists, and health and welfare agencies	_____	_____
5. Specific programs such as:		
a. Tuberculosis chest X-ray	_____	_____
b. Dental examination and X-ray program	_____	_____
c. Nutrition	_____	_____
d. Venereal disease program	_____	_____
e. Immunization program, etc.	_____	_____
G. Assistance with Safety Activities and Environmental Sanitation		
1. History of worker's accident	_____	_____
2. Instruction on safety regulations at time of treatment	_____	_____
3. Accident reports for management, safety committees, insurance companies, etc.	_____	_____
4. Assistance with compensation records	_____	_____
5. Member of Safety Committee	_____	_____
6. Supervision of personal protective equipment	_____	_____
7. First-aid instruction	_____	_____
8. Assistance with routine sanitary inspection	_____	_____
H. Participation in Plant Welfare Program		
1. Assistance with group sick benefit plans	_____	_____
2. Hospitalization and life insurance plans	_____	_____
3. Recreational program	_____	_____
I. Records and Reports		
1. Daily statistical tally	_____	_____
2. Individual health record for workers	_____	_____
Note: A continuous record should be kept of all occupational and non-occupational injuries and illnesses treated.		
3. Monthly reports to management	_____	_____
4. Annual reports to management	_____	_____
5. Compensation and insurance reports	_____	_____
6. Disability absentee reports	_____	_____
J. Home Nursing		
1. Full-time plant visiting nurse service	_____	_____
2. Part-time plant visiting nurse service	_____	_____
3. Outside agencies' nursing service, such as Visiting Nurse Association, insurance companies, city and county health departments, etc.	_____	_____

It is realized that some of the items listed above may not come within the sphere of the plant nurse's activities; in other instances she may be rendering additional services of considerable importance which, while apparently intangible, nevertheless are of great importance. . . .

II. Employers' Evaluation

	Yes	No
A. Medical Direction		
1. Full-time physician	_____	_____
2. Part-time physician	_____	_____
3. On-call physician	_____	_____
B. Your Plant Medical Department		
1. Location		
a. Near employment and personnel departments	_____	_____
b. Where privacy may be assured the workers	_____	_____
c. Centrally located as possible	_____	_____
d. Near plumbing facilities for water supply	_____	_____
e. In as quiet an area as possible	_____	_____

	Yes	No
2. Size of Medical Department		
The medical department should consist of a minimum of three rooms.		
a. Waiting area	_____	_____
b. Rest room with small cot or bed	_____	_____
c. Treatment room	_____	_____
Adequate in size with proper furnishings and equipment to include nurse's desk and locked filing cabinet for industrial health records.		
3. Necessary Features of Medical Department		
a. Good ventilation	_____	_____
b. Good lighting	_____	_____
c. Pleasing, cheerful appearance	_____	_____
d. Adequate equipment to properly carry on the necessary functions of the department	_____	_____
C. Cooperating with Nurse in Securing Standing Orders from Plant Physician		
	_____	_____
D. Providing Necessary Record for Medical Department		
1. Individual health record.		
To include record for all treatment given whether of occupational or non-occupational nature	_____	_____
2. Health history records	_____	_____
3. Daily statistical tally sheets	_____	_____
4. Monthly and annual report forms	_____	_____
5. Interdepartmental forms	_____	_____
E. Procedures or Method for Hiring Professional Personnel		
1. Through nurse placement and counselling service.		
2. Local universities giving advanced courses in industrial nursing.		
F. Salary for Industrial Nurse		

Do you use the schedule as recommended in the booklet *1949 Employment Standards for Industrial Nurses?* (State of Illinois.)

Source: Ziano, Joan Y., R.N., and Moore, Mildred M. J., R.N. (Nursing Consultants, Division of Industrial Hygiene, Illinois State Department of Public Health): A Yardstick for Measuring Industrial Services in your Plant. *What's New in Industrial Hygiene*, 6:1-3 (July-September) 1949.

Exhibit 15.—Names of directors and addresses of nonofficial agencies providing part-time nursing service to industry, 1950

Miss Helen R. Floyd, Director Visiting Nurse Association 1912 8th Avenue South Birmingham, Alabama	Miss Harriett Muncil, Director Visiting Nurse Association Security National Bank Building (Room 214) Kansas City, Kansas
Miss Dorothy Wilson Executive Director Visiting Nurse Association 35 Elm Street New Haven, Connecticut	Miss Velma P. Haley, Director District Nursing Association 187 Middle Street Portland, Maine
Miss Beatrice Short, Director Visiting Nurse Association 224 N. Meridian Street Indianapolis, Indiana	Miss Mary M. Sullivan, Director Visiting Nurse Association 14 Somerset Street Boston 8, Massachusetts

Miss Elizabeth E. Barry
Executive Director
Visiting Nurse Association
35 Bigelow Street
Cambridge 39, Massachusetts

Miss Dorothy W. Doe, President
Franklin Nursing Association, Inc.
Town Hall—70 W. Central Street
Franklin, Massachusetts

Miss Charlotte L. Cornwell
Nursing Supervisor
Visiting Nurse Association
54 Castle Street
Great Barrington, Massachusetts

Miss Amelia C. Beauregard
Executive Director
Visiting Nurse Association, Inc.
315 Maple Street
Holyoke, Massachusetts

Miss Helen H. Gilbert, Treasurer
Visiting Nurse Association of Dover,
Medfield and Norfolk, Inc.
P. O. Box 163
Needham 92, Massachusetts

Miss Catherine Flynn, Supervisor
Needham Visiting Nurse Association
51 Lincoln Street
Needham, Massachusetts

Mrs. Madeline K. Maynard
Executive Director
Visiting Nurse Association
33 Pearl Street
Pittsfield, Massachusetts

Miss Ruth F. Wheeler
Executive Director
District Nursing Association
764 Main Street
Waltham 54, Massachusetts

Miss Ella L. Pensinger
Executive Director
Worcester Society for District Nursing
8 Chestnut Street
Worcester, Massachusetts

Miss Emilie G. Sargent
Executive Director
Visiting Nurse Association
51 West Warren Avenue
Detroit, Michigan

Miss Lilian S. Henderson, Director
Visiting Nurse Association
522 Cass Street
Saginaw, Michigan

Miss Melvina F. Palmer, Director
Community Health Service
316 Third Avenue, South
Minneapolis, Minnesota

Miss Eleanor Patricia Duffy
Executive Director
Visiting Nurse Association of Eastern
Union County
125 Broad Street
Elizabeth, New Jersey

Mrs. Carrie Nelson Carbone, Director
Central Bergen Visiting Nurse Service,
Inc.
329 River Street
Hackensack, New Jersey

Miss Mildred E. Gonyeau, Executive
Director
Visiting Nurse Association of Oranges
and Maplewood, Inc.
439 Main Street
Orange, New Jersey

Mrs. Ruth F. Mullis
Supervisor of Nurses
Northern Bergen Nursing Service, Inc.
Municipal Building
Ramsey, New Jersey

Miss Eleanor W. Mole
Executive Director
Visiting Nurse Association of Brooklyn,
Inc.
138 South Oxford Street
Brooklyn, New York

Miss Marian G. Randall
Executive Director
Visiting Nurse Service of New York
598 Madison Avenue
New York 22, New York

Miss F. Eleanor Strause
Director-Supervisor
Community Nursing Service
111 Walnut Street
Johnstown, Pennsylvania

Miss Vesta M. Miller, Director
Visiting Nurse Association
134 N. Lime Street
Lancaster, Pennsylvania

Miss Ruth W. Hubbard
General Director
Visiting Nurse Society
1340 Lombard Street
Philadelphia, Pennsylvania

Miss Elizabeth Decker,
Executive Director
Visiting Nurse Association of Scranton
and Lackawanna County
324 Chamber of Commerce Building
Scranton, Pennsylvania

Miss Netta Ford, Executive Director
Visiting Nurse Association of York and
York County
218 East Market Street
York, Pennsylvania

Miss Emma K. Spooner, Head Nurse
Smithfield Public Health League
Farnum Pike
Georgiaville, Rhode Island

Miss Nellie R. Dillon, Director
Providence District Nursing Association
157 Waterman Street
Providence, Rhode Island

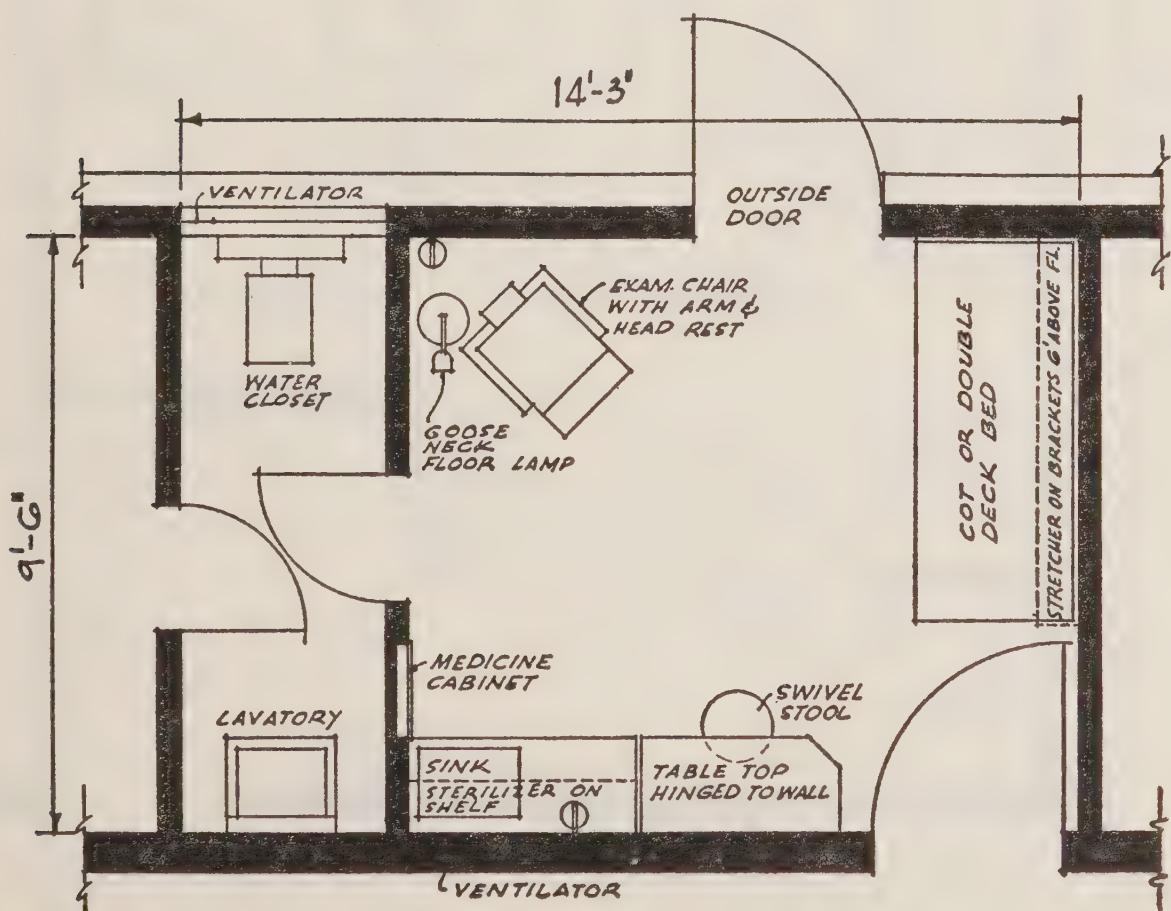
Miss Inez L. Davis, Director
Visiting Nurse Association
310 N. Durkee Street
Appleton, Wisconsin

Miss Aileen Remmel, Director
Visiting Nurse Association
115 E. Forest
Neenah, Wisconsin

Source: National Organization of Public Health Nursing. New York, 1951. Unpublished data.

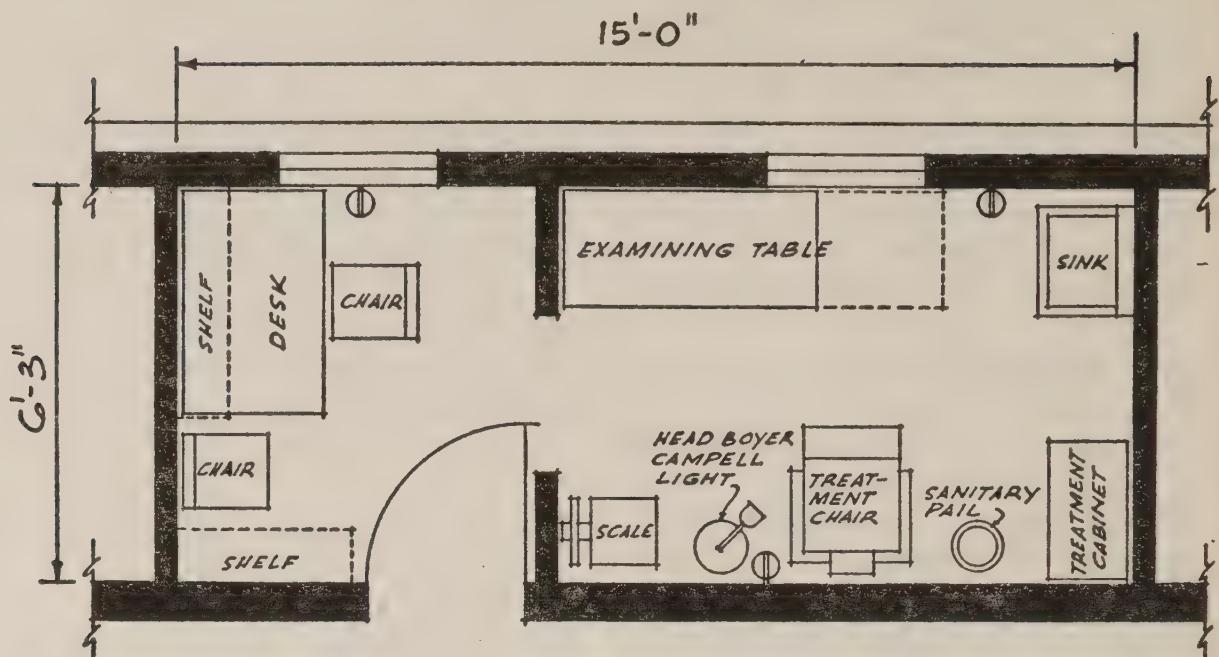
Exhibit 16.—*Examples of floor plans*

First-aid room for a small plant



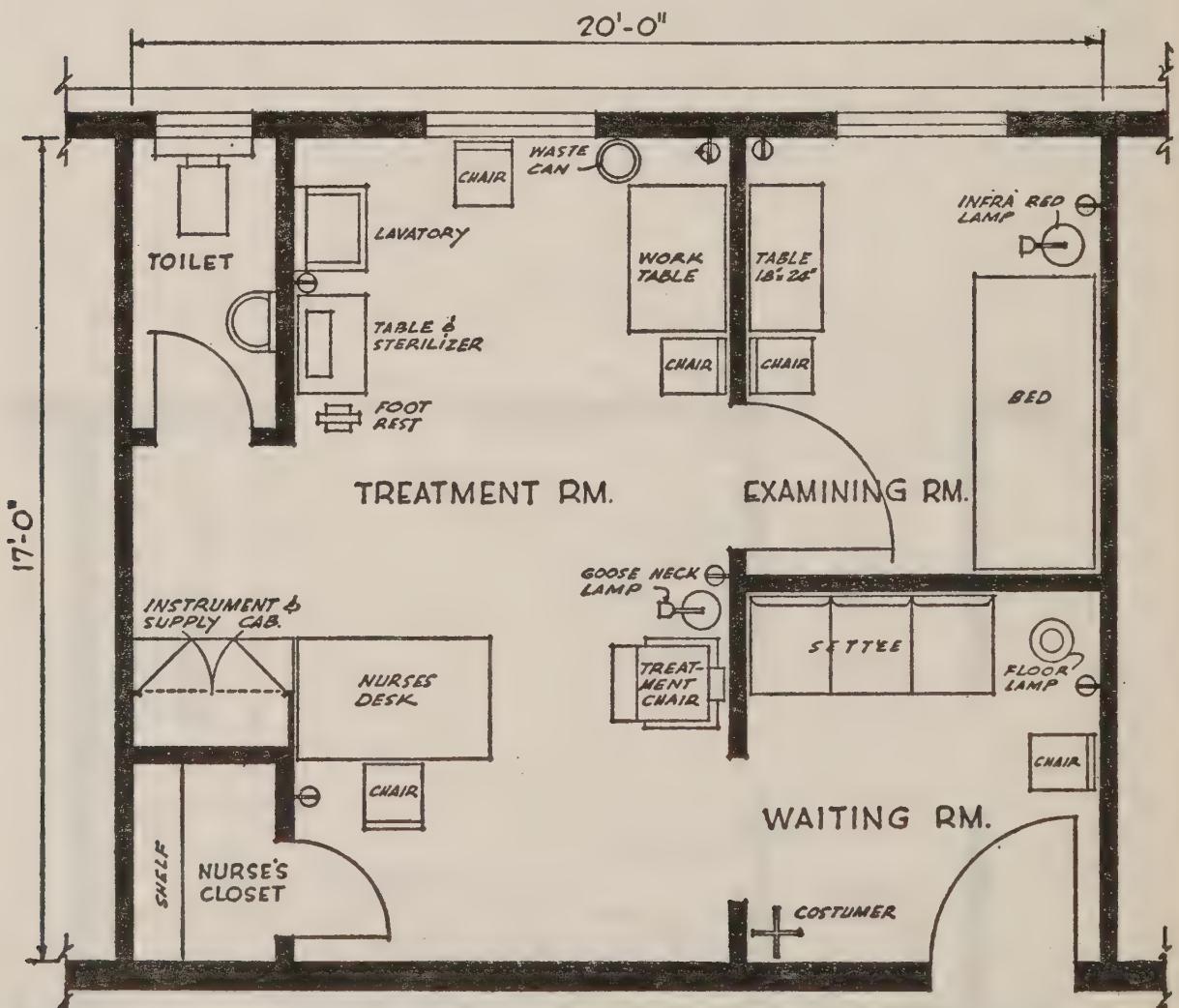
Source: Ritter, Wayne L., and Dugger, J. W.: Industrial Health Units—Considerations and Designs for the Smaller Installations. *Industrial Medicine*, 12 : 651 (October) 1943.

First-aid room for a small plant



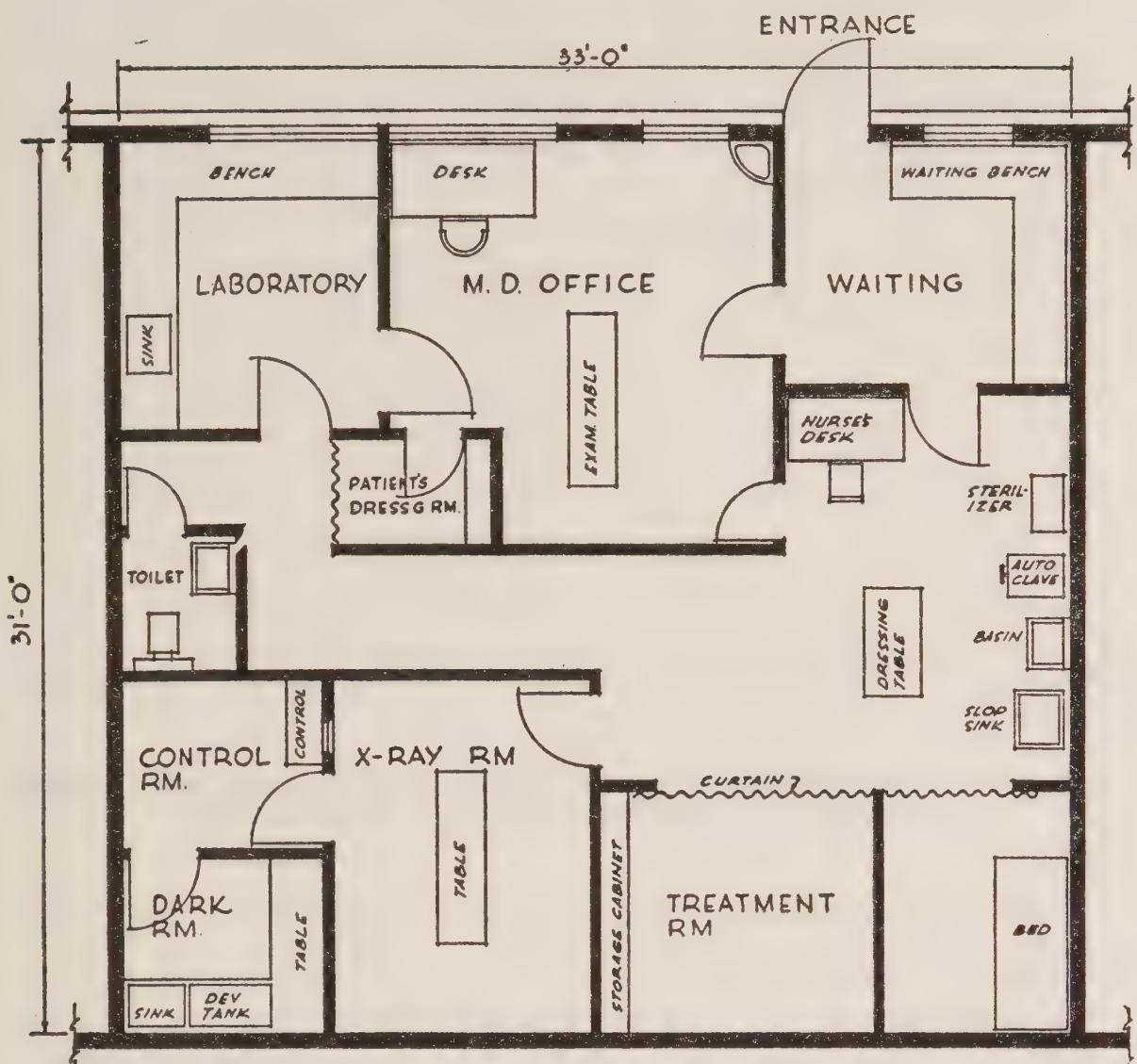
Source: Millman, Nathan: Medical Departments in Small Plants—Layout, Equipment, and Cost. *Industrial Medicine*, 16 : 175 (April) 1947.

Dispensary for a small plant



Source: American Mutual Liability Insurance Co.: *Plan for an Industrial Medical Department*. Boston, The Company, 1946, page 6.

Medical department for a medium-sized plant



Source: Hess, Gaylord R.: *Medical Service in Industry and Workmen's Compensation Laws*. Chicago, American College of Surgeons, 1946, page 11.

Exhibit 17.—Equipment for small plant dispensary recommended by the Council on Industrial Health, American Medical Association

A. General furnishings:

Sink	Foot pedal waste can
Instrument cabinet	Waste basket
Sterilizer	First-aid kits
Dressing table	Storage cabinets
Leg rest	Paper towel rack
Cot	Adhesive rack
Stretcher	Record file
Mirror, 10 by 12 inches	Scale

B. Instruments and supplies:

Scalpels	Loupe
Splinter forceps	Head mirror
Tissue forceps	Hand magnifying glass
Hemostatic forceps	Syringes
Bandage scissors	Assorted hypodermic needles
Iris scissors	Assorted surgeon's needles
Surgical scissors	Needle holder

Assorted bandages	Assorted jars and basins
Adhesive plaster	Test tubes
Cotton	Safety razor and blades
Assorted gauze dressings	Hot-water bottle
Assorted sutures	Ice cap
Assorted splints	Crutches
Assorted catheters	Tourniquet

C. Physical examination equipment:

Stethoscope	Hemoglobinometer
Blood-pressure apparatus	Wassermann tubes
Thermometer	Microscope
Otoscope	Simple urine testing outfit
Ophthalmoscope	Centrifuge
Nose and ear speculums	Dynamometer
Laryngeal mirror	Tuning fork
Spotlight	Reflex hammer
Tongue depressors	Flesh pencil
Snellen vision chart	Rubber gloves and finger cots

Source: American Medical Association, Council on Industrial Health: Medical Service in Industry: Industrial Medical Department. *Journal of the American Medical Association*, 117 : 34-35 (July 5) 1941.

Exhibit 18.—Suggested quarters and equipment for a small plant medical department, Astoria-Long Island City program, 1945

A. ROOM

Approximately 1 square foot per employee—to be divided into treatment room, consultation room and examination room.

A bench for waiting should be supplied.

The department should be adequately lighted, heated, ventilated, clean and quiet and should contain a sink with hot and cold running water, a telephone and a toilet, if possible.

B. EQUIPMENT

1. Small desk and chair
2. Record file
3. Floor lamp (spot light)
4. Couch (with linen and blanket)
5. Folding stretcher
6. Enameled combination treatment table and instrument cabinet
7. Treatment chair with arm and foot basins
8. One additional chair
9. Soap dispenser and paper towel rack
10. Sterilizer
11. 1 basin
12. Scale, and height rod
13. Examining table, if possible
14. Supplies closet or wall cabinet
15. Eye charts (Snellen) and color charts
—or telebinocular
16. Infra-red lamp (optional)
17. Ultra-violet lamp (optional)

C. SUPPLIES

1. Thermometers—2 mouth, 1 rectal
2. Scalpel, safety razor and blades
3. Forceps—splinter, tissue, hemostatic
4. 6 clamps—3 small, 3 medium
5. Scissors, bandage and surgical
6. Eye spud
7. Syringes—2 and 10 cc.
8. Hypo needles—assorted size
9. Suturing needles—assorted
10. Needle holder
11. Assorted bandages—gauze
12. Assorted adhesive—plaster
13. Cotton

14. Assorted sutures	21. Finger cots
15. Assorted splints	22. Several rubber catheters
16. 1 tourniquet	23. Hemoglobinometer
17. Wooden tongue blades and applicators	24. Glass slides—1 box
18. Test tubes—1 dozen and test-tube holder	25. Assorted chemicals (benzine, antiseptic solution, Benedict's solution, acetic acid, green soap and local anesthetic)
19. Alcohol lamp	
20. Rubber gloves— $\frac{1}{4}$ dozen	

Source: Millman, Nathan: Medical Departments in Small Plants—Layout, Equipment and Costs. *Industrial Medicine*, 16 : 174 (April) 1947.

Exhibit 19.—*Nurse's daily report work sheet*

Number of individuals given service: Male..... Female.....

Number of home visits..... Number of plant inspections.....

Source: McGrath, Bethel J.: *Nursing in Commerce and Industry*. New York, The Commonwealth Fund, 1946. p. 258.

Exhibit 20.—Monthly report on number of visits by reason for visit and department, and disposition of cases

Report for _____ 19..

Man hours worked.....

Average number of employees.....

Number of cases treated for: Occupational causes.....

Non-occupational causes.....

Total visits to health service.....

Man hours lost due to: Occupational causes.....

Non-occupational causes.....

Reason for visit	Department						Disposition											
	No. 1		No. 2		No. 3		No. 4		No. 5		No. 6		Total	Physician	Hospital	Agency	Home	Other	Returned to work
	Occ.	Non.	Occ.	Non.	Occ.	Non.	Occ.	Non.	Occ.	Non.	Occ.	Non.	Physician	Hospital	Agency	Home	Other	
Injuries: Total																		
Abrasions																		
Contusions																		
Lacerations																		
Burns																		
Skin:																		
Foreign bodies																		
Dermatitis																		
Strains and sprains																		
Eyes:																		
Foreign bodies																		
Flash burns																		
Conjunctivitis																		
Other																		
Redressings																		
Other																		
Illnesses: Total																		
Headache																		
Upper respiratory																		
Other respiratory																		
Gastro-intestinal																		
Dysmenorrhea																		
Eye and ear																		
Skin																		
Muscular and joint pains																		
Retreatments																		
Other																		

Exhibit 20.—Monthly report on number of visits by reason for visit and department, and disposition of cases—Continued

Conference only:							Laboratory activities
Health supervision.....							
Family worries.....							
Physical examinations.....							
Home visits.....							
Plant inspections.....							

Source: McGrath, Bethel J.: *Nursing in Commerce and Industry*. New York, The Commonwealth Fund, 1946. p. 257

Exhibit 21.—Suggested form for individual service record

Name..... Department..... Badge number.....

Date of birth..... Sex..... Date of last physical examination.....

Source: McGrath, Bethel J.: *Nursing in Commerce and Industry*. New York, The Commonwealth Fund, 1946. p. 254.

Exhibit 22.—Referral form to private physician and form for use by physician in reporting back to industry

Referral of injured worker to physician by plant nurse

Date.....

Referred to

Name of physician

Name of patient

The employee named above is sent to you for medical attention. Will you please return this form so that we will know if he may return to work?

.....
Signature of nurse

Physician's report to nurse

Type of injury

Employee may return to work: Yes..... No.....

Further medical attention required: Yes..... No..... If so, employee should return to my office

Medication or nursing care to be given by the plant nurse

.....
Signature of physician

If this report is returned by the patient, please place in the attached envelope and seal.

Source: McGrath, Bethel J.: *Nursing in Commerce and Industry*. New York, The Commonwealth Fund, 1946. p. 256.

Exhibit 23.—Procedure for establishing and recording cost of health services in industry (small plants)

As a result of inquiries received from various locations concerning costs of industrial health programs, it seemed desirable to outline suggested procedures and purposes for recording such health program costs. This subject has been broken down into three main divisions and will be treated separately as follows:

A. *Reasons why it is desirable to keep an account of health service costs.*—Only with a knowledge of operating costs of a health service will a plant be able to accurately arrive at a true figure as to actual annual cost per employee or per case in the operation of the medical department over a given period of time. With such cost statistics, the individual responsible for this activity is in a position to compare costs with other or similar industries.

A study of items of expense over a given operating period may be helpful in determining where and how department activities may be expanded or curtailed. For example, it may be ascertained from the budgetary records of costs and expenditures that costs of outside professional fees (such as laboratory tests) are such that it would be more economical to expand the medical facilities or staff to include these services within your own department rather than referring them to outside sources. In a word, the same reasons that apply to the keeping of budgetary and operating records in other departments apply equally well to the medical department.

B. *Methods suggested for establishing and maintaining an accounting of health service costs.*—This can usually be done by requesting the accounting department to assign a separate account number or code to be used in recording all proper operating expenses of your medical department. This account should be separate from all other departmental accounts, kept in itemized form, and compiled in report form each month.

C. Items to be included and chargeable to health service costs, listed as follows:

1. Doctor's salary or fees.
2. Nurse's salary.
3. Other medical department personnel salaries (such as secretaries, stenographers, clerks, technicians, etc.).
4. Supplies (bandages, medications, etc.).
5. Stationery.
6. Publications.
7. Laundry.
8. Rent (also usually includes electricity, water, heat, etc.).
9. Maintenance (repairs, porter service, etc.).
10. Outside fees (such as laboratory tests that are done by independent contractors).
11. Miscellaneous (not included above).
12. Depreciation of permanent or capital equipment.¹

This procedure has been written to serve as a guide for those plants which may be interested in developing a system for recording expenditures chargeable to an industrial health service. It is understood that this suggested procedure will require modification in individual plants depending upon accounting methods.

¹ The total cost of permanent or capital equipment may be prorated according to the life expectancy of the equipment. For example, if a cabinet is expected to last 5 years and cost \$50 when new, then an item of \$10 per year depreciation is allowed.

Source: Sappington, C. O., M.D., Dr. P. H.: *Industrial Health Department Functions and Relationships* (Medical Series: Bull. No. VIII). Pittsburgh, Industrial Hygiene Foundation, 1948. 98 pp.

Table 24.—Companies reporting cost data on health, medical and safety programs, and average per capita cost, by size of plant, 1950¹

Size group	Number of companies	Per capita cost
All companies.....	² 1,576	\$25.90
1-250.....	730	45.39
251-500.....	304	40.52
501-1,000.....	212	39.87
1,001-2,500.....	212	28.87
2,501-5,000.....	64	21.90
Over 5,000.....	41	15.67

¹ Based on a 1951 survey of member companies made by the National Association of Manufacturers, 1951.

² Includes companies whose employment was not reported.

Source: Bachman, George W., D.Sc., and associates: *Health Resources in the United States, Availability of Personnel, Facilities, and Services*. Washington, Brookings Institution, 1952. In press.

Table 25.—Plants reporting cost data on in-plant medical programs and the average per capita cost, by size and type of plant, 1949¹

Size group (number of employees)	Total plants reporting		Manufacturing		Non-manufacturing	
	Number	Average per capita cost	Number	Average per capita cost	Number	Average per capita cost
All plants..	442	\$14.53	381	\$14.78	61	\$13.31
Under 500.....	40	26.43	40	26.43	.....	.....
500-999.....	78	16.81	71	16.54	7	19.76
1,000-2,499.....	150	15.19	136	14.56	14	20.91
2,500-4,999.....	103	13.05	76	13.52	27	11.72
5,000-7,499.....	34	14.06	29	12.93	5	21.19
7,500-14,999.....	27	9.48	19	9.34	8	9.79
15,000-34,999.....	10	21.51	10	21.51	.....	.....

¹ Based on a survey by the American College of Surgeons. The 442 plants reporting cost data had a total of 1,362,248 employees.

Source: Bachman, George W., D.Sc., and associates: *Health Resources in the United States, Availability of Personnel, Facilities, and Services*. Washington, Brookings Institution, 1952. In press.

Table 26.—Persons employed, original investment, monthly cost of health program, and number and type of medical and auxiliary personnel employed in 12 small establishments¹

Number of persons employed	Original invest- ment ²	Monthly cost				Number of type of personnel				
		Total	Other than salary	Salary		Physicians		Nurses	At- tend- ants	Other
				Amt.	Per- cent	Full-time	Part- time			
430.....	\$17,000	\$675	\$285	\$390	58	.....	1	1	3	.....
357.....	656	439	100	339	75	.....	1	1	.....	.....
175.....	500	10	10	.....	.....	.....	2	.....	2	.....
426.....	7,600	427	108	319	75	.....	1	1	.....	.....
349.....	51,800	11,151	6,067	5,084	46	1	.....	4	.....	46
196.....	500	195	70	125	64	.....	2	.....	2	.....
143.....	1,500	160	20	140	84	.....	2	1	.....	.....
483.....	3,000	550	100	450	82	.....	1	1	.....	.....
345.....	4,000	700	.....	700	.....	.....	1	4	.....	.....
480.....	1,000	625	25	600	96	.....	1	1	2	.....
323.....	450	400	100	300	75	.....	1	2	.....	52
415.....	2,250	675	50	625	93	.....	1	62	.....	61

¹ Data compiled as part of a survey of 278 establishments, made during 1945-47.

² For several of these establishments, the original investment included building costs.

3 On-call physicians.

4 1 superintendent, 1 assistant director, 2 engineers, 1 dietician, 1 inspector.

5 1 part-time sanitary inspector, 1 part-time dental assistant.

6 Includes 1 part-time visiting nurse; establishment also employs 1 part-time clerk.

Source: Sappington, C. O., M.D.: *Industrial Health Department Functions and Relationships (Medical Series: Bull. No. VII)*. Pittsburgh, Industrial Hygiene Foundation, 1948, p. 24.

Table 27.—Estimated annual cost of cooperative health center serving a group of small plants, by type of expense and number of employees to be served, 1950¹

Item	1,000 employees	2,000 employees	5,000 employees
Physician ²	\$4,000	\$8,000	\$12,000
Nurses ³	5,000	10,000	17,500
Clerks ⁴	1,800	1,800	3,600
Supplies	1,200	2,400	6,000
Rent, heat, light	2,400	2,400	4,800
Total cost	14,400	24,600	43,900
Per capita cost	14.40	12.30	8.78

¹ Excludes prorated cost of equipment.

² For 1,000 employees, one half time; for 2,000, one full time; for 5,000, one full time and one half time.

³ For 1,000 employees, two full time; for 2,000, four full time; for 5,000, seven full time.

⁴ For 1,000 employees, one full time; for 2,000, one full time; for 5,000, two full time.

Source: Petrie, Lester M., M.D.: Health Maintenance in Small Plants. *Southern Medical Journal*, 44: 555-560 (June) 1951.

Table 28.—Cost of installing and equipping medical departments in seven small plants participating in Astoria-Long Island City program, 1945

Item	Type of manufacture						
	Porcelain products	Printing	Paints	Processed foods	Amusement machines	Chemicals	Carbon parts
Number of employees	70	125	200	225	300	350	700
Number of rooms in medical department	2	2	3	11	3	7	4
Total cost ²	\$550	\$1,116	\$2,485	\$2,600	\$1,453	\$3,667	\$1,050
Construction	75	653	1,485	1,800	723	3,187	-----
Plumbing	140	-----	700	185	-----	-----	-----
Electrical	105	-----	150	-----	-----	300	-----
Labor	52	-----	-----	-----	181	-----	-----
Painting	356	-----	950	-----	225	250	-----
Other	-----	-----	-----	-----	132	2,637	-----
Equipment	475	463	1,000	800	730	480	-----
Medical equipment	389	389	1,000	800	580	-----	-----
Furniture	75	-----	-----	-----	150	-----	-----

¹ Lack of space made it necessary to limit department to one room 8 × 20 feet, with draw curtains installed in lieu of partitions.

² The average cost of construction and equipment in these seven plants was less than \$1 per employee annually on a 10-year depreciation basis.

Source: Millman, Nathan, M.D.: Medical Departments in Small Plants—Layout, Equipment and Costs. *Industrial Medicine*, 16: 174-180 (April) 1947.

Exhibit 24.—Advantages of plant medical service

The National Association of Manufacturers has weighed the evidence pro and con on industrial health service and stands convinced that health programs at the plant level are essential to all forward-looking, hard-hitting industrial operations.

Plant medical service pays steady, demonstrable dividends in at least ten ways which are vital to the efficient operation of every company:

1. For your employees plant medical service means a long step toward good health and good working conditions. You simply cannot get good results without them.
2. It means increased efficiency on the job, both manual and mental.
3. It means less time lost because of illness.
4. It means fewer accidents—health and safety are Siamese twins.
5. For the company a sound medical service means less money paid out for workmen's compensation.
6. It means a sharp reduction in labor turnover—good working conditions will

take you a long way toward attracting and holding the best qualified man for the job.

7. It means more production for each payroll dollar. On that ground alone I could rest my case, but there are other advantages which no enterprise can afford to ignore.

8. For your customers industrial hygiene means the increased satisfaction that is produced by healthy teamwork, with every possible man on the job and alert to deliver a product of the best quality in sufficient quantity and on time.

9. A medical program is basic to your whole public relations status. If you do your share toward keeping employees healthy, they will do a far better than average job of speaking loud, often and favorably about their boss, their factory and their product.

10. Finally, plant medical service pays dividends in pride, pride in having everything shipshape, pride in doing the job right, the sort of pride which makes small companies grow into big ones.

Source: Heiser, Victor G., M.D.: How Plant Medical Service Can Help Industry. *Occupational Medicine*, 3 : 179-181 (February) 1947.

Exhibit 25.—Conclusions regarding medical services in small and medium-sized plants, Liberty Mutual Insurance Co.

The conclusions are based on a thorough inspection and study of nearly 1,000 plants, 500 of which might be termed average plants and a study of complete medical programs carried on by several large industries. The study was organized by the Division of Industrial Medicine, Liberty Mutual Insurance Co., to explore small and medium-sized plants and find out how medical services could be most effectively used. Registered nurses working under a qualified physician made the inspections.

1. Plants vary sharply in their actual needs for medical service, and no standard pattern is practical.

2. Special consideration for the return on the dollar invested in medical service is necessary. There is no question concerning the general desirability of full-scale programs of medical service in plants of all sizes, but, from an economic standpoint, the medical programs designed for small and medium-sized plants must be carefully adapted to the medical needs of these plants to minimize unwarranted expense.

3. Basically, effective medical service in any plant requires the support of management, coordination with the operating departments and thoughtful adaptation for the specific needs of the plant. It is also essential that the medical service be furnished by a qualified physician who is thoroughly familiar with plant operations and plant personnel. The physician must definitely understand the relationship of his work with other procedures in the plant. His interest and active participation in obtaining maximum return for the money spent on the medical service are essential.

4. The number of employees in a plant is not in itself an adequate basis on which to determine the amount or type of medical service which a particular plant may require.

5. In fitting medical service to a small or medium-sized plant, the following factors must be given consideration:

- (a) The number of persons.
- (b) Their age.
- (c) The percentage of women.
- (d) The labor turnover.
- (e) The working conditions.
- (f) The location of risk.
- (g) The economic level of the workers and their intelligence.
- (h) Existing medical plans.

- (i) The type of work according to physical demands.
- (j) Existing community health plans.
- (k) Exposure to occupational disease.
- (l) The problem of traumatic injury.
- (m) Intangibles.

Source: Seymour, W. H. Fitting the Medical Service to the Plant. *Occupational Medicine*, 3 : 45-52 (January) 1947.

Table 29.—Distribution of surveyed establishments according to report on special benefits derived from medical department operations¹

Benefit	Total surveyed	Establishments				
		Reporting			Not answering	With no medical department
		Yes	No	No opinion		
Number						
Improves employee health.....	333	237	6	48	39	3
Improves employee efficiency.....	333	230	6	47	47	3
Reduces employee turnover.....	333	170	16	95	49	3
Promotes safety.....	333	255	5	33	37	3
Reduces absenteeism.....	333	237	7	46	40	3
Reduces cost ratio of insurance.....	333	191	12	69	58	3
Assists in proper placement.....	333	259	9	24	38	3
Improves employer-employee relations.....	333	247	2	38	43	3
Percent						
Improves employee health.....	100	71.2	1.8	14.4	11.7	0.9
Improves employee efficiency.....	100	69.1	1.8	14.1	14.1	.9
Reduces employee turnover.....	100	51.1	4.8	28.5	14.7	.9
Promotes safety.....	100	76.6	1.5	9.9	11.1	.9
Reduces absenteeism.....	100	71.2	2.1	13.8	12.0	.9
Reduces cost ratio of insurance.....	100	57.4	3.6	20.7	17.4	.9
Assists in proper placement.....	100	77.8	2.7	7.2	11.4	.9
Improves employer-employee relations.....	100	74.2	.6	11.4	12.9	.9

¹ Data are based on a survey of 333 industrial establishments in the United States and Canada—a few Canadian companies participated. Industries covered a work force of more than 1.5 million persons, with 6.9 percent of the establishments employing less than 250 workers and 20.1 percent 5,000 or more. More than 30 types of industrial groups participated. With only 2 exceptions, not more than 10 percent of the 333 cooperating establishments were in any 1 group (machinery, 10.8; metals, 13.2).

Source: Spears, Ethel M.: *Company Medical and Health Programs (Studies in Personnel Policy, No. 96)* New York, National Industrial Conference Board, Inc., 1948, p. 72.

Table 30.—Measures of value of medical and personnel program, Allen Manufacturing Company, Hartford, Conn., 1943–51

Measures of performance	1943	1944	1945	1946	1947	1948	1949	1950	1951
Monthly turnover rate (all reasons including layoff):									
Allen.....percent.....	5.5	3.5	2.3	1.4	1.9	1.1	13.9	0.7	0.7
Hartford area.....do.....	5.3	24.4	7.5	4.2	4.3	2.8	2.4	1.7	1.9
Occupational accidents:									
Lost-time per 100 cases.....	4.2	3.6	1.5	3.8	1.2	0.6	0.5	0.4	0
Total number, all cases.....	113	61	40	56	61	22	19	38	72
Frequency rate:									
Allen.....	18.43	15.48	7.51	21.35	6.78	3.0	2.78	2.15	0
Hartford area.....	22.37	18.18	12.40	11.12	10.01	8.71	7.01	7.31	8.18
Severity rate:									
Allen.....	0.455	0.321	0.104	0.610	0.148	0.157	0.150	0.254	0.032
Hartford area.....	0.353	0.713	0.338	0.446	0.331	0.260	0.236	0.212	0.200
Monthly absentee rate (all reasons including leaves of absence).....percent.....	5.8	5.1	3.8	2.9	3.3	2.4	1.7	1.8	2.7
Length of service:									
0–1 year.....percent.....	31.0	6.5	7.5	7.0	6.0	8.0	0.8	24.3	18.9
1–5 years.....do.....	52.0	69.5	59.5	43.0	23.0	16.0	12.5	9.0	24.4
5–10 years.....do.....	13.0	15.0	23.0	38.0	53.0	58.0	60.2	36.4	32.3
10 years and over.....do.....	4.0	9.0	10.0	12.0	18.0	18.0	26.5	30.3	24.4
Grievances per 100 employees.....	3	2.4	0.8	0.3	2.2	2.1	45.3	2.1	0
Average earned group bonus (by percent of factory employees).....percent.....	8.5	14.0	21.4	22.3	25.6	27.3	25.6	31.3	31.1
Sales per employee ⁵ (dollar volume of company sales per employee in 1940—100).....	117	136	148	149	152	167	163	226	266

¹ All but 0.5 percent to layoffs as result of recession in 1949.

² Reflecting widespread layoffs at end of World War II.

³ The company had no union until November of this year.

⁴ Majority of these involved seniority in connection with layoff.

⁵ Price changes during this period are not weighted, but they amounted to less than 7 percent starting in 1947.

Source: Seybold, Geneva. *Personnel Administration in the Small Company: Studies in Personnel Policy*, No. 117. New York, National Industrial Conference Board, 1951. p. 29.; data for 1950 and 1951 secured through personal interviews and correspondence with the Allen Manufacturing Co.

Table 31.—Participation in designated items of industrial hygiene programs of State health departments during fiscal year 1951 and planned for 1952¹

Items in order of frequency of performance	Number of States			
	Participating		Reporting expansion or initiation for 1951	Planning expansion or initiation for 1952
	1951	1952 (planned)		
Follow-up on compliance with recommended improvements	52	51	23	² 27
Coordination of activities of other official and voluntary agencies for improvement of the health of industrial workers	51	50	20	² 20
Laboratory and field analyses of environmental materials	50	50	28	² 24
Promotion of industrial hygiene education	50	50	23	² 19
Initial surveys of industrial establishments for determination of hazards	50	49	19	² 23
Conduct of technical studies of potential health hazards	49	48	25	² 26
Investigation of suspected or reported occupational diseases	49	48	19	² 17
Distribution of health education materials	49	48	14	² 18
Review of engineering plans for control measures	47	48	15	16
Integration of industrial hygiene with health education and information consultation service	47	46	19	² 18
Conduct of atmospheric pollution investigations	46	45	26	15
Integration of industrial hygiene with tuberculosis diagnostic facilities	46	46	7	² 11
Staff participation in teaching industrial hygiene	44	44	20	² 17
Development of health education materials	42	42	14	² 17
Development of instruments and methods	40	39	11	13
Integration of industrial hygiene with venereal disease diagnostic and treatment services	39	38	3	² 6
Analysis of clinical materials	39	37	³ 9	11
Stimulation of the keeping or analysis of sickness absenteeism records by industry	38	39	12	13
Provision of direct medical services, including physical examinations, X-ray, etc.	38	37	7	9
Conduct of a program for improving occupational disease reporting ⁴	36	39	14	² 16
Provision of consultant services regarding establishment or improvement of plant nursing services	36	35	14	14
Integration of industrial hygiene with nutrition consultation service	36	34	6	10
Provision of consultant services regarding establishment or improvement of plant medical programs	35	34	12	14
Provision of consultant services regarding establishment or improvement of plant dental services	16	16	4	² 5

¹ Includes data submitted by New York and Massachusetts, in which States industrial hygiene program is the responsibility of an agency other than the State health department.

² Previously discontinued item to be reactivated in 1 State.

³ Previously discontinued item reactivated in 1 State.

⁴ Information incomplete in 1 State.

Source: U. S. Public Health Service, from information submitted in the annual combined report and plan, fiscal year 1952.

Exhibit 26.—Federal, State, and local industrial hygiene agencies

This list of Federal, State, and local industrial hygiene agencies is published here for the benefit of readers who may wish to request information or services from their own units.

FEDERAL

WASHINGTON 25, D. C.—Dr. Seward E. Miller, Chief, Division of Occupational Health, U. S. Public Health Service, FSA.

CINCINNATI 2, OHIO—Dr. W. Clark Cooper, Chief, Division of Occupational Health Field Headquarters, U. S. Public Health Service.

SALT LAKE CITY, UTAH—Dr. L. J. Cralley, Chief, Occupational Health Field Station, U. S. Public Health Service.

STATE AND LOCAL

ALABAMA—Director, Division of Industrial Hygiene, Alabama Department of Public Health, Birmingham.

ARIZONA—Mr. G. W. Marx, Director, Bureau of Sanitation, Arizona Department of Health, Phoenix.

ARKANSAS—Mr. L. E. Renes, Director, Division of Industrial Hygiene, Arkansas State Board of Health, Little Rock.

CALIFORNIA—Chief, Bureau of Adult Health, California Department of Public Health, Berkeley 2.

California—Mr. Jack C. Rogers, Director, Division of Industrial Health, Los Angeles City Department of Health, Los Angeles 13.

California—Dr. Melvin R. Plancey, Director, Division of Industrial Hygiene, Los Angeles County Health Department, Los Angeles 12.

California—Mr. Sidney F. Dommes, Jr., Oakland City Department of Health, City Hall, Oakland 12.

COLORADO—Joseph E. Cannon, Chief, Occupational Health Section, Colorado Board of Health, Denver 2.

CONNECTICUT—Dr. T. Howard Johnston, Director, Bureau of Industrial Hygiene, Connecticut Department of Health, Hartford 1.

DISTRICT OF COLUMBIA—Dr. Fred H. Goldman, Bureau of Public Health Engineering, District of Columbia Health Department, Washington 1.

FLORIDA—Dr. J. M. McDonald, Director, Industrial Hygiene Division, Florida State Board of Health, Jacksonville.

GEORGIA—Dr. L. M. Petrie, Director, Division of Industrial Hygiene, Georgia Department of Public Health, Atlanta 3.

IDAHO—Mr. H. C. Clare, Director of Public Health Engineering, Idaho Department of Public Health, Boise.

ILLINOIS—Mr. Arvid Tienson, Chief, Supervising Engineering Factory Inspection Division, Illinois Department of Labor, Chicago 1.

INDIANA—Dr. L. W. Spolyar, Director, Division of Industrial Hygiene, Indiana State Board of Health, Indianapolis 7.

IOWA—Mr. C. L. Campbell, Chief, Industrial Hygiene Section, Iowa Department of Health, Des Moines 19.

KANSAS—Mr. James F. Aiken, Jr., Acting Chief, Industrial Hygiene Section, Kansas State Board of Health, Lawrence.

KENTUCKY—Mr. W. W. Stalker, Director, Division of Industrial Health, Kentucky Department of Health, Louisville 2.

LOUISIANA—Mr. W. H. Reinhart, Chief, Industrial Hygiene Section, Louisiana Department of Health, New Orleans 7.

MAINE—Mr. R. H. Mansur, Chemist, Industrial Hygiene Section, State Department of Health and Welfare, Augusta.

MARYLAND—Dr. W. F. Reindollar, Chief, Division of Industrial Health and Air Pollution, Maryland Department of Health, Baltimore 18.

Maryland—Mr. Charles E. Couchman, Director, Bureau of Industrial Hygiene, Baltimore City Health Department, Baltimore 2.

MASSACHUSETTS—Director, Division of Occupational Hygiene, Massachusetts Department of Labor and Industries, Boston 10.

MICHIGAN—Mr. John C. Soet, Acting Director, Division of Industrial Health, Michigan Department of Health, Lansing 4.

Michigan—Dr. W. G. Fredrick, Director, Bureau of Industrial Hygiene, Detroit Department of Health, Detroit 2.

MINNESOTA—Dr. W. E. Park, Director, Division of Industrial Health, Minnesota Department of Health, Minneapolis 14.

MISSISSIPPI—Dr. J. W. Dugger, Director, Division of Industrial Hygiene, Mississippi Board of Health, Jackson 113.

MISSOURI—Mr. L. F. Garber, Chief, Bureau of Industrial Hygiene, Division of Health of Missouri, Jefferson City.

Missouri—Mr. John Magill, Director, Industrial Hygiene Service, Kansas City Health Department, Kansas City 6.

Missouri—Dr. B. W. Lewis, Acting Chief, Industrial Hygiene Section, St. Louis Health Division, St. Louis 3.

Missouri—Mr. R. W. Lamberton, Director, St. Louis County Health Department, 651 South Brentwood Boulevard, Clayton 5.

MONTANA—Mr. L. S. Champa, Chemist, Division of Industrial Hygiene, Montana Board of Health, Helena.

NEBRASKA—Mr. L. O. Vose, Acting Director, Industrial Hygiene Division, Nebraska Department of Health, Lincoln 9.

NEW HAMPSHIRE—Dr. F. J. Vintinner, Director, Bureau of Occupational Health, New Hampshire Department of Health, Concord.	RHODE ISLAND—Dr. J. P. Deery, Medical Director, Division of Industrial Hygiene, Rhode Island Department of Health, Providence 3.
NEW JERSEY—Dr. Miriam Sachs, Chief, Bureau of Adult and Industrial Health, New Jersey Department of Health, Trenton 7.	TENNESSEE—Dr. E. C. Mulliniks, Director, Industrial Hygiene Service, Tennessee Department of Public Health, Nashville 4.
NEW MEXICO—Mr. Carl Jensen, Supervisor of Industrial Hygiene, New Mexico Department of Public Health, Santa Fe.	TEXAS—Mr. M. C. Wukasch, Engineer, Industrial Hygiene Section, Texas State Department of Health, Austin 2.
NEW YORK—Dr. Leonard Greenburg, Director, Division of Industrial Hygiene and Safety Standards, New York State Department of Labor, New York 13.	UTAH—Mr. E. E. Morrill, Jr., Director, Division of Occupational Health, Utah Department of Health, Salt Lake City 1.
NORTH CAROLINA—Dr. O. J. Swisher, Jr., Director, Division of Industrial Hygiene, North Carolina Board of Health, Raleigh.	VERMONT—Mr. H. B. Ashe, Director, Industrial Hygiene Division, Vermont Department of Public Health, Barre.
NORTH DAKOTA—Mr. J. H. Svore, Chief Sanitary Engineer, Environmental Sanitation Service, State Department of Health, Bismarck.	VIRGINIA—Mr. Harry E. Seifert, Director, Bureau of Industrial Hygiene, Virginia State Department of Health, Richmond 19.
OHIO—Dr. T. F. Mancuso, Chief, Industrial Hygiene Division, Ohio Department of Health, Columbus 15.	WASHINGTON—Dr. J. L. Jones, Chief, Division of Preventive Medical Service, Washington Department of Health, Seattle 4.
Ohio—Mr. H. G. Dykter, Commissioner, Division of Air Pollution Control, Cleveland Department of Public Health and Welfare, Cleveland 14.	WEST VIRGINIA—Mr. P. D. Halley, Associate Director, Bureau of Industrial Hygiene, West Virginia Department of Health, Charleston 5.
OKLAHOMA—Mr. W. C. Galegar, Assistant Engineer, Industrial Hygiene Division, Oklahoma State Department of Health, Oklahoma City 5.	WISCONSIN—Mr. W. L. Lea, Director, Industrial Hygiene Division, Wisconsin Board of Health, Madison 2.
OREGON—Dr. R. R. Sullivan, Director, Industrial Hygiene Section, Oregon Board of Health, Portland 5.	Wisconsin—Mr. L. A. Penn, Engineer, Industrial Hygiene Section, City Health Department, Milwaukee 2.
PENNSYLVANIA—Dr. Joseph Shilen, Director, Bureau of Industrial Hygiene, Pennsylvania Department of Health, Harrisburg.	WYOMING—Mr. R. E. Sundin, Engineer-in-charge, Industrial Hygiene Service, Wyoming Department of Public Health, Cheyenne.
Pennsylvania—Mr. Lee Schreibeis, Industrial Hygiene Engineer, Industrial Hygiene Division, Pittsburgh Department of Public Health, Pittsburgh.	HAWAII—Mr. F. A. Schramm, Chief, Bureau of Industrial Hygiene, Department of Health, Honolulu.
Source: <i>Industrial Health Monthly</i> , 11: 190-191 (December) 1951. (Revised)	

Exhibit 27.—Industrial hygiene services provided gratuitously by the Bureau of Industrial Hygiene of the Pennsylvania Department of Health

Medical services

1. Consultation on the diagnosis and prevention of occupational diseases.
2. Assistance and advice in the organization and administration of adequate medical programs in industrial plants.
3. Studies of occupational diseases and other conditions affecting the health of industrial groups, such as X-ray, electrocardiogram, etc.

Engineering services

1. Quantitative atmospheric determinations of dusts, gases, volatile solvents, toxic metals, etc.
2. Measurements and advice on air velocities, light, heat, humidity, and ventilation.
3. Advice on mechanical and engineering methods of controlling hazards.

Nursing services

1. Rendering consultant services to industry by the following methods:
 - (a) Assisting in planning health programs in small industries.
 - (b) Obtaining qualified industrial nurses.
 - (c) Assisting with the improvement of the nursing program.
2. Rendering consultant services to the individual industrial nurse.
3. Stimulating the organization of industrial nurses in the State.

Dental services

1. Consultation for the improvement of dental defects in industrial workers.
2. Assistance and advice in the organization and administration of adequate dental programs in industrial plants.
3. Studies of dental problems by means of X-ray services.

Nutritional services

Consultation and advice on problems of in-plant feeding of industrial workers.

Source: *Greater Williamsport's Industrial Health Bulletin*, 1 : 4 (March 19) 1948.

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See also list of references following each small plant program description in Section III.

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